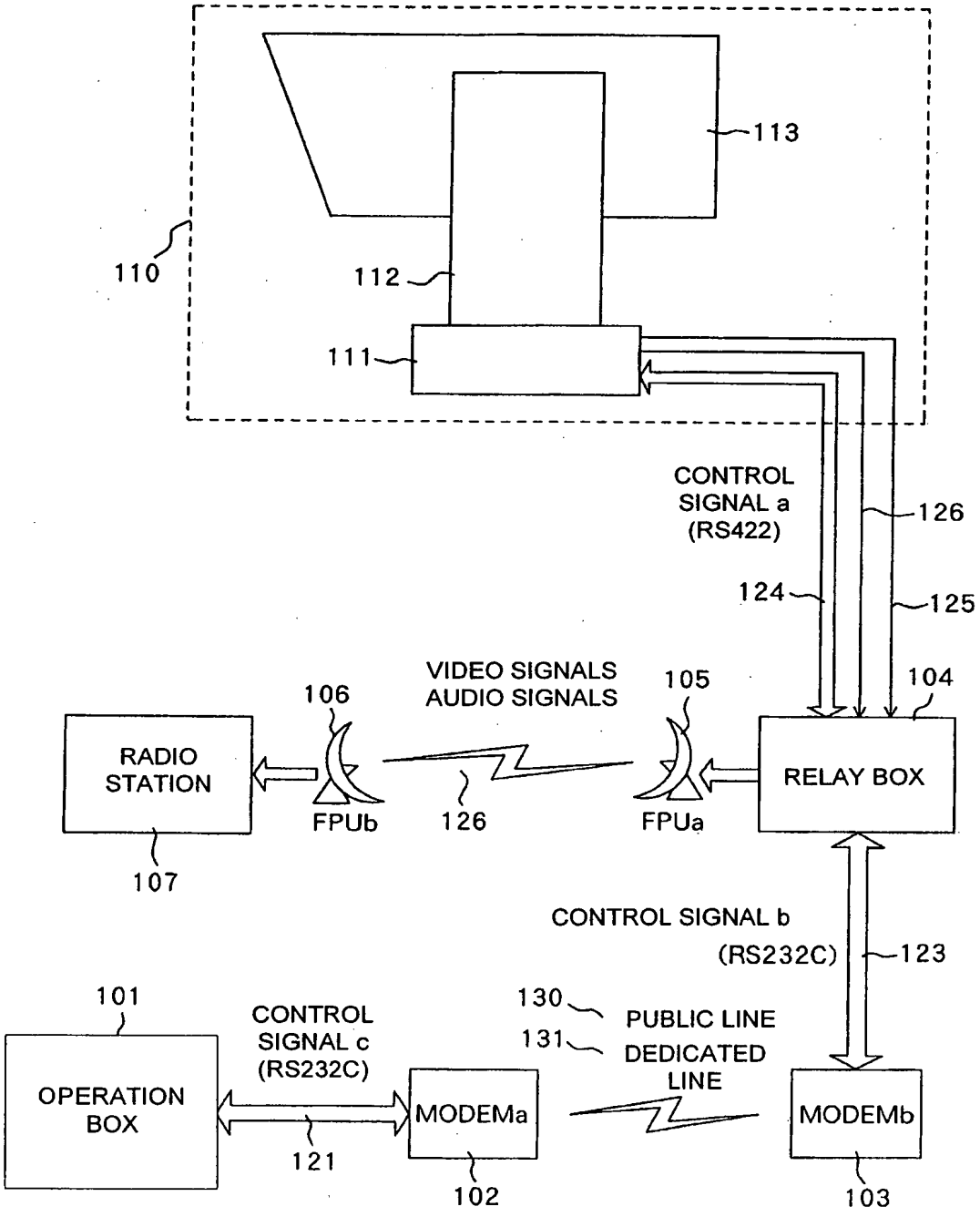

113
110
112
111
CONTROL
SIGNAL a
(RS422)
126
124
125
VIDEO SIGNALS
AUDIO SIGNALS
106
105
104
RADIO
STATION
FPUb
126
FPUa
RELAY BOX
107
CONTROL SIGNAL b
(RS232C)
123
101
CONTROL
SIGNAL c
(RS232C)
130
PUBLIC LINE
131
DEDICATED
LINE
OPERATION
BOX
MODEMa
MODEMb
121
102
103

FIG. 1

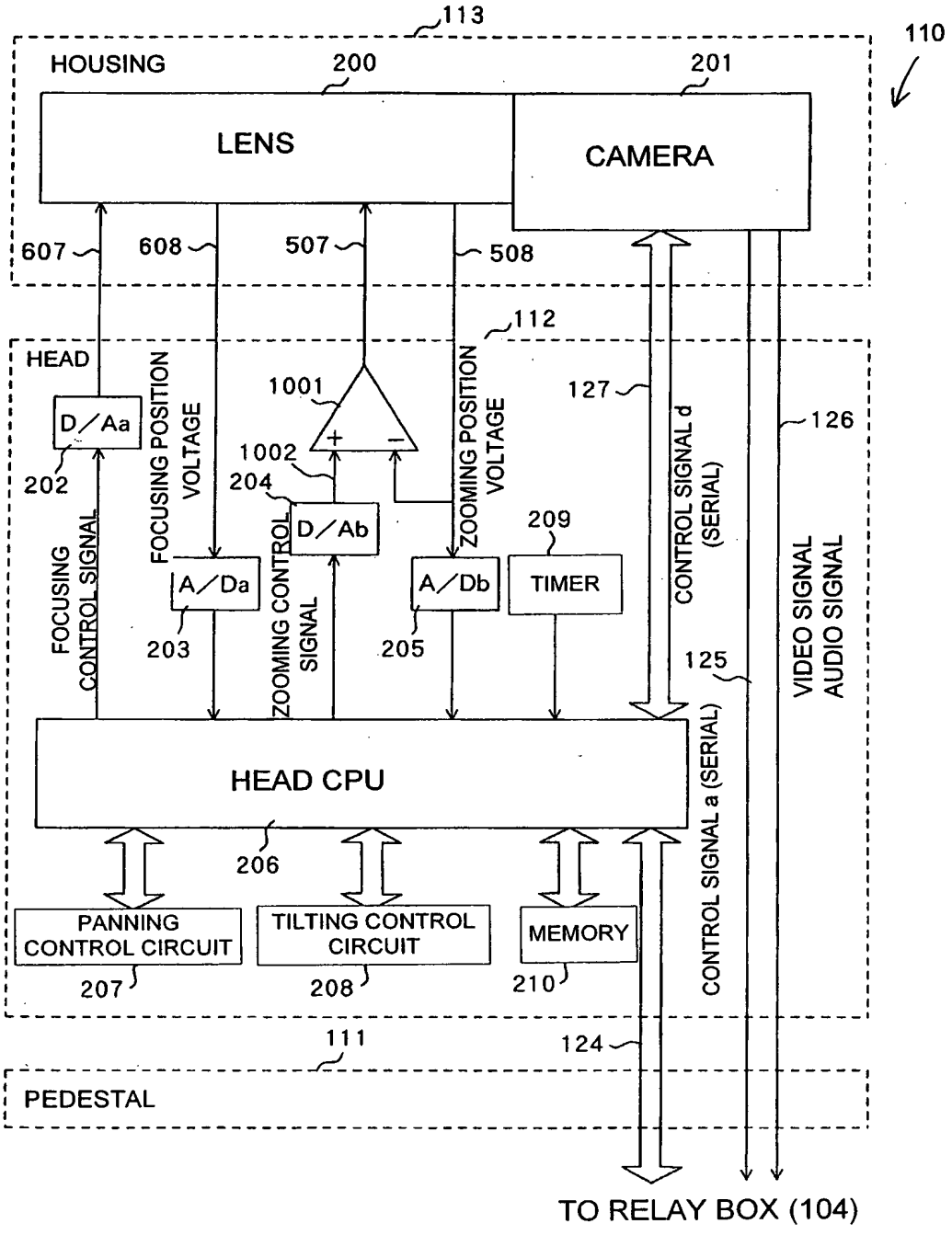

113
110
HOUSING
200
201
LENS
CAMERA
607
608
507
508
112
HEAD
1001
127
126
D/Aa
202
1002
204
D/Ab
209
FOCUSING POSITION VOLTAGE
ZOOMING POSITION VOLTAGE
CONTROL SIGNAL d (SERIAL)
FOCUSING CONTROL SIGNAL
A/Da
203
ZOOMING CONTROL SIGNAL
A/Db
205
TIMER
125
VIDEO SIGNAL AUDIO SIGNAL
HEAD CPU
206
CONTROL SIGNAL a (SERIAL)
PANNING CONTROL CIRCUIT
207
TILTING CONTROL CIRCUIT
208
MEMORY
210
111
124
PEDESTAL
TO RELAY BOX (104)

FIG. 2

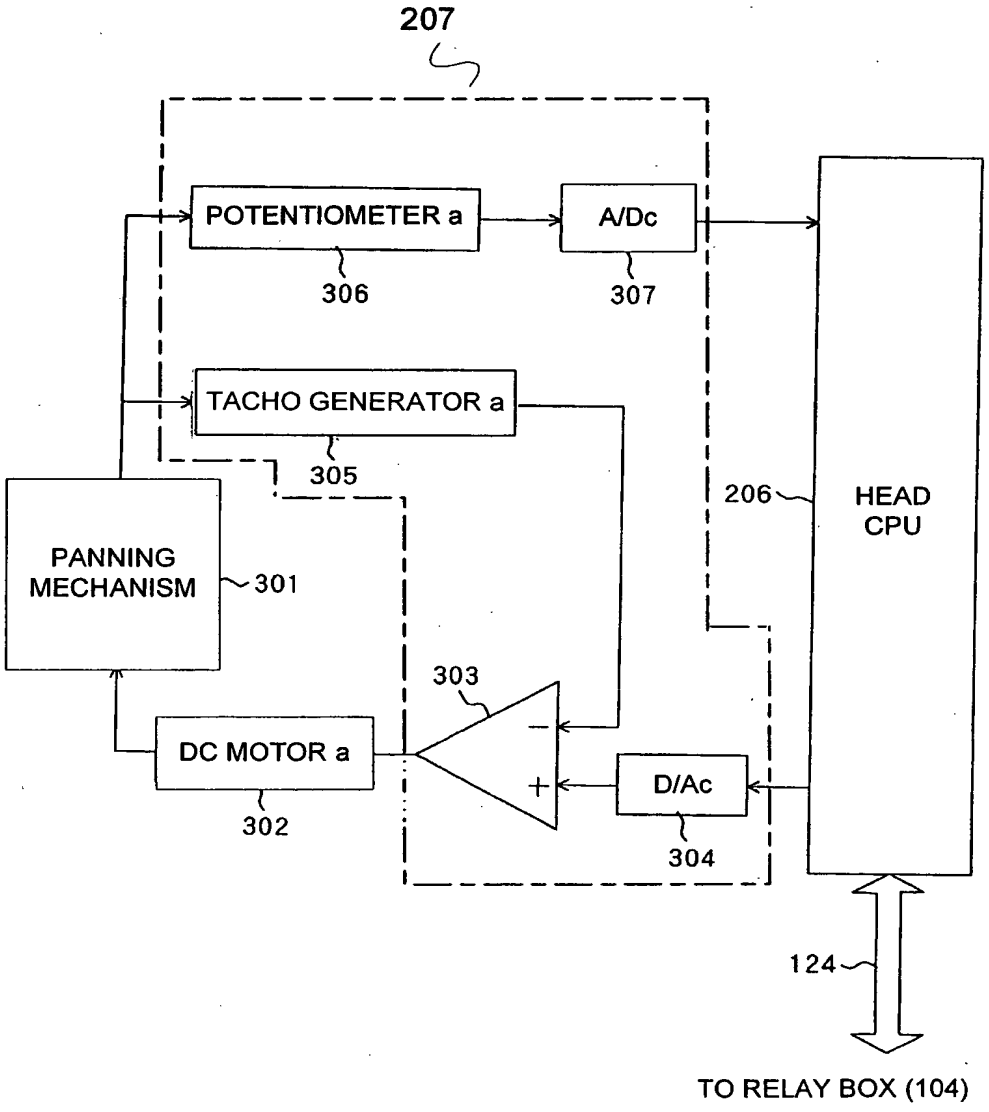

207
POTENTIOMETER a
306
A/Dc
307
TACHO GENERATOR a
305
206
HEAD CPU
PANNING MECHANISM
301
303
DC MOTOR a
302
D/Ac
304
124
TO RELAY BOX (104)

FIG. 3

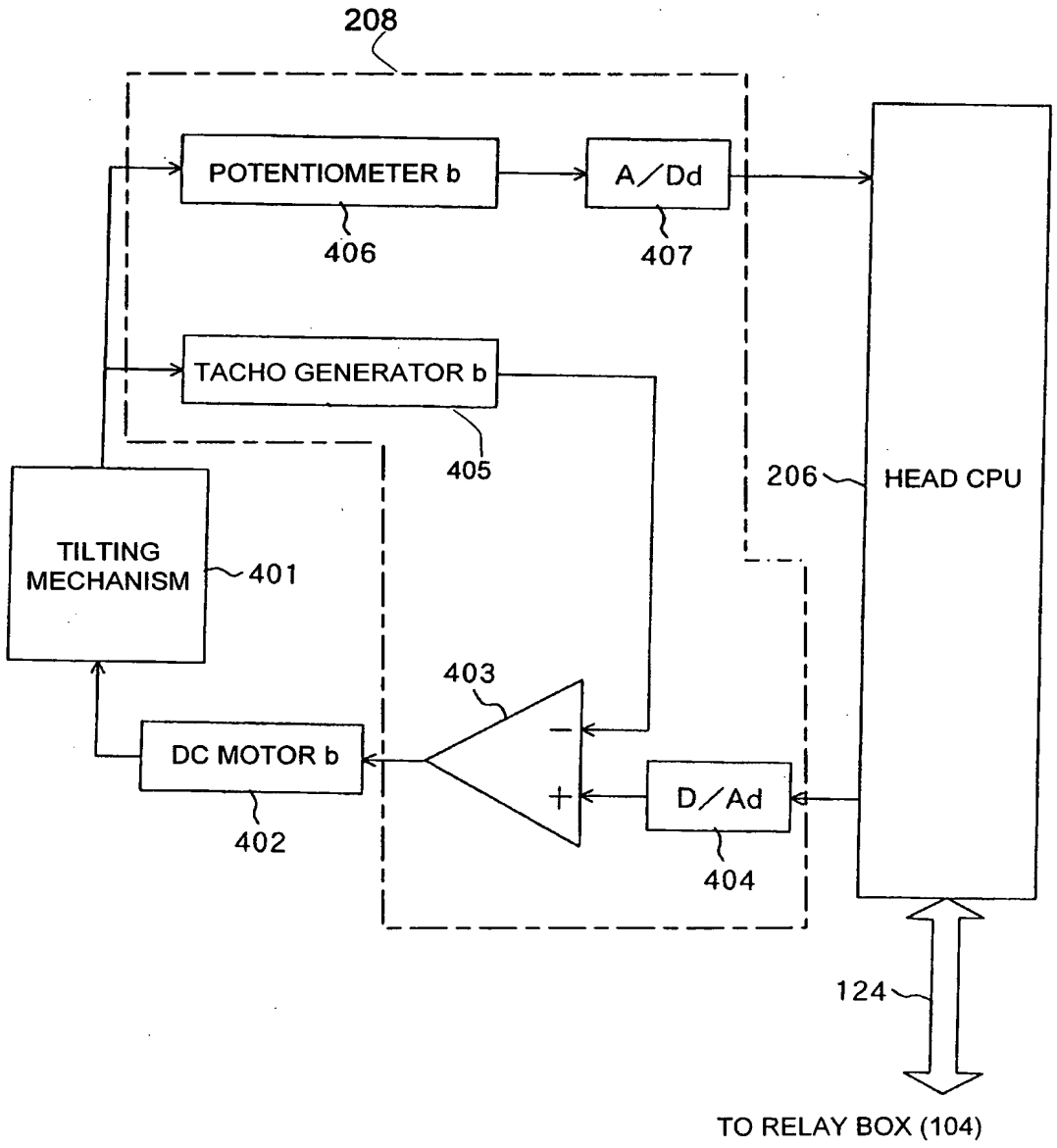

208
POTENTIOMETER b
406
A/Dd
407
TACHO GENERATOR b
405
206
HEAD CPU
TILTING MECHANISM
401
403
DC MOTOR b
402
D/Ad
404
124
TO RELAY BOX (104)

FIG. 4

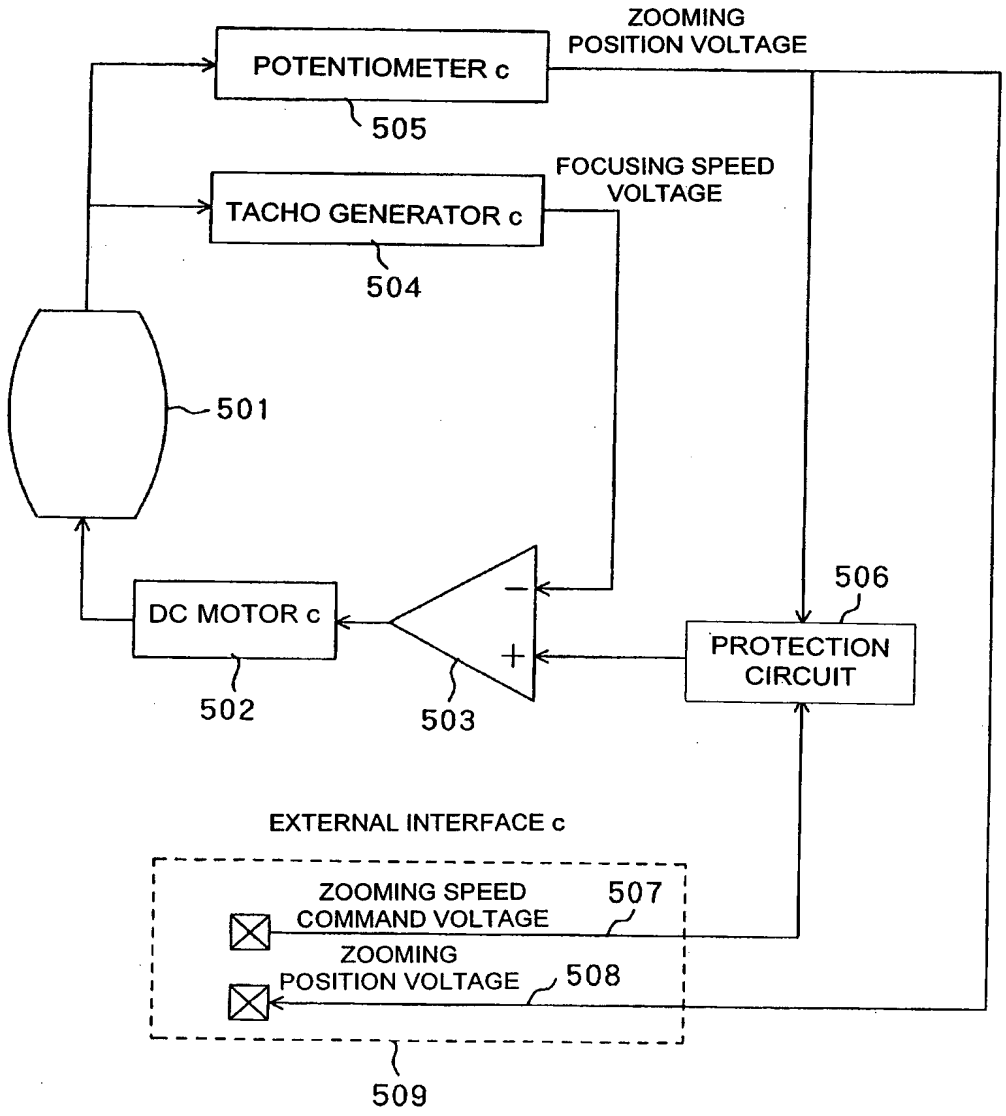

ZOOMING
POSITION VOLTAGE
POTENTIOMETER c
505
FOCUSING SPEED
VOLTAGE
TACHO GENERATOR c
504
501
506
DC MOTOR c
PROTECTION
CIRCUIT
502
503
EXTERNAL INTERFACE c
ZOOMING SPEED
COMMAND VOLTAGE
507
ZOOMING
POSITION VOLTAGE
508
509

FIG. 5

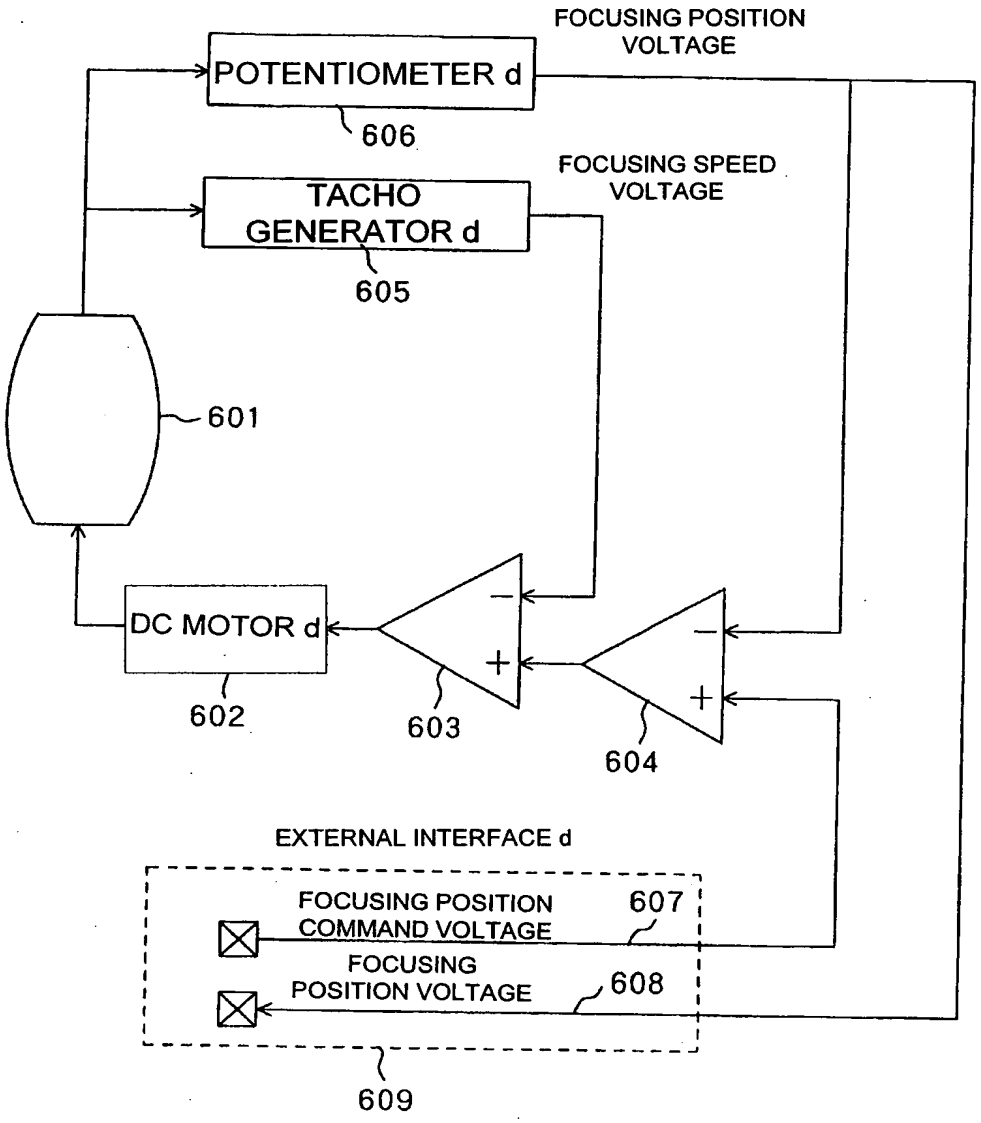

FOCUSING POSITION VOLTAGE
POTENTIOMETER d
606
FOCUSING SPEED VOLTAGE
TACHO GENERATOR d
605
601
DC MOTOR d
602
603
604
EXTERNAL INTERFACE d
FOCUSING POSITION COMMAND VOLTAGE
607
FOCUSING POSITION VOLTAGE
608
609

FIG. 6

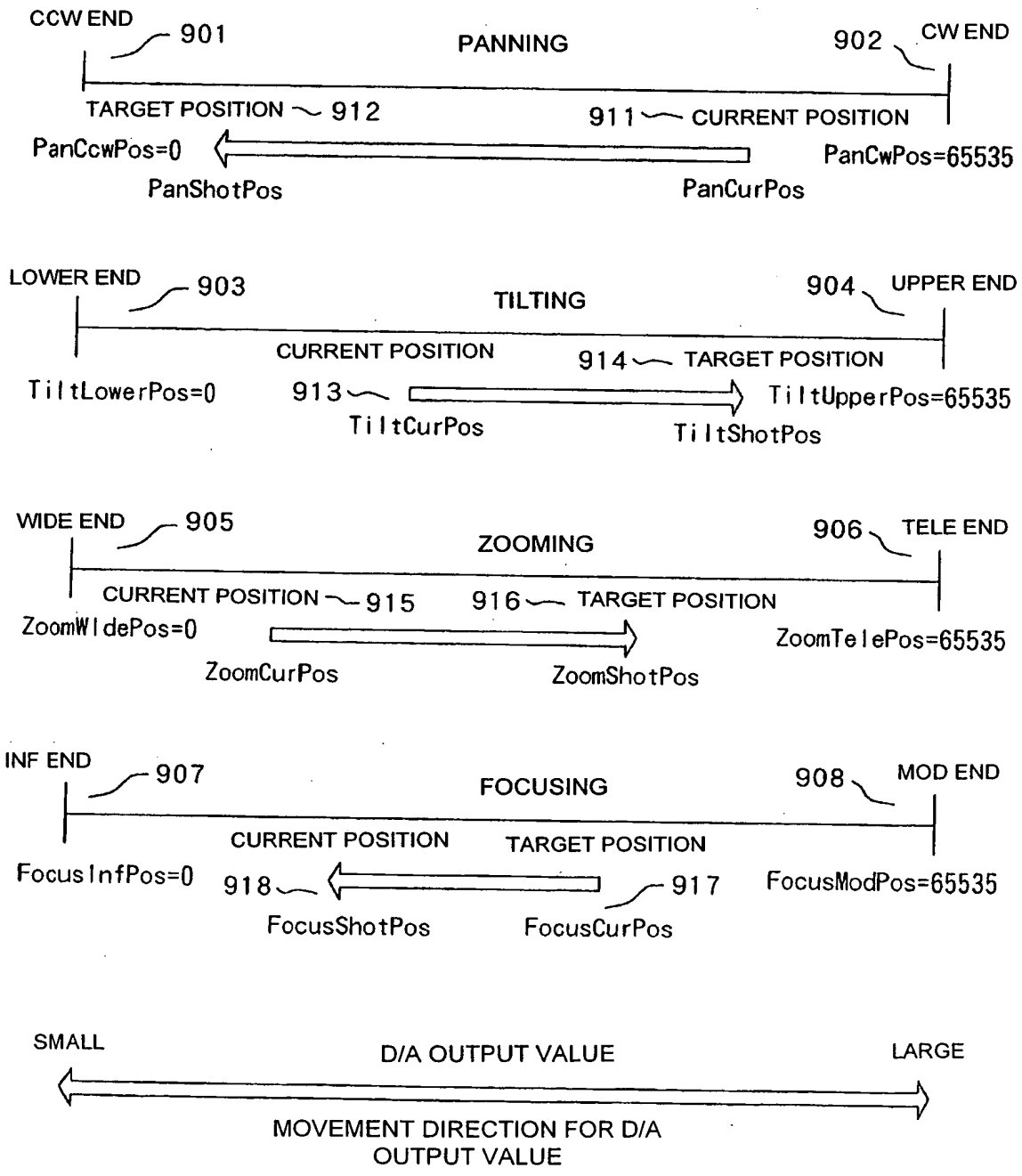

CCW END
901
PANNING
902
CW END
TARGET POSITION
912
911
CURRENT POSITION
PanCcwPos=0
PanCwPos=65535
PanShotPos
PanCurPos
LOWER END
903
TILTING
904
UPPER END
CURRENT POSITION
914
TARGET POSITION
TiltLowerPos=0
913
TiltUpperPos=65535
TiltCurPos
TiltShotPos
WIDE END
905
ZOOMING
906
TELE END
CURRENT POSITION
915
916
TARGET POSITION
ZoomWIdePos=0
ZoomTelePos=65535
ZoomCurPos
ZoomShotPos
INF END
907
FOCUSING
908
MOD END
CURRENT POSITION
TARGET POSITION
FocusInfPos=0
918
917
FocusModPos=65535
FocusShotPos
FocusCurPos
SMALL
D/A OUTPUT VALUE
LARGE
MOVEMENT DIRECTION FOR D/A
OUTPUT VALUE

FIG. 7

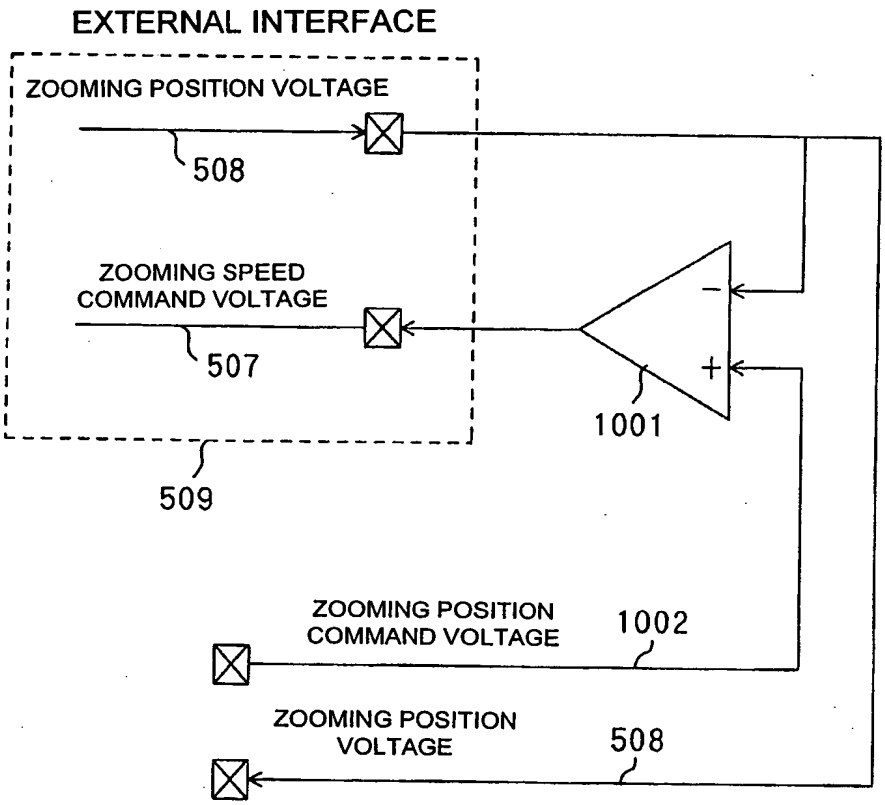

EXTERNAL INTERFACE
ZOOMING POSITION VOLTAGE
508
ZOOMING SPEED
COMMAND VOLTAGE
507
509
1001
ZOOMING POSITION
COMMAND VOLTAGE
1002
ZOOMING POSITION
VOLTAGE
508

FIG. 8

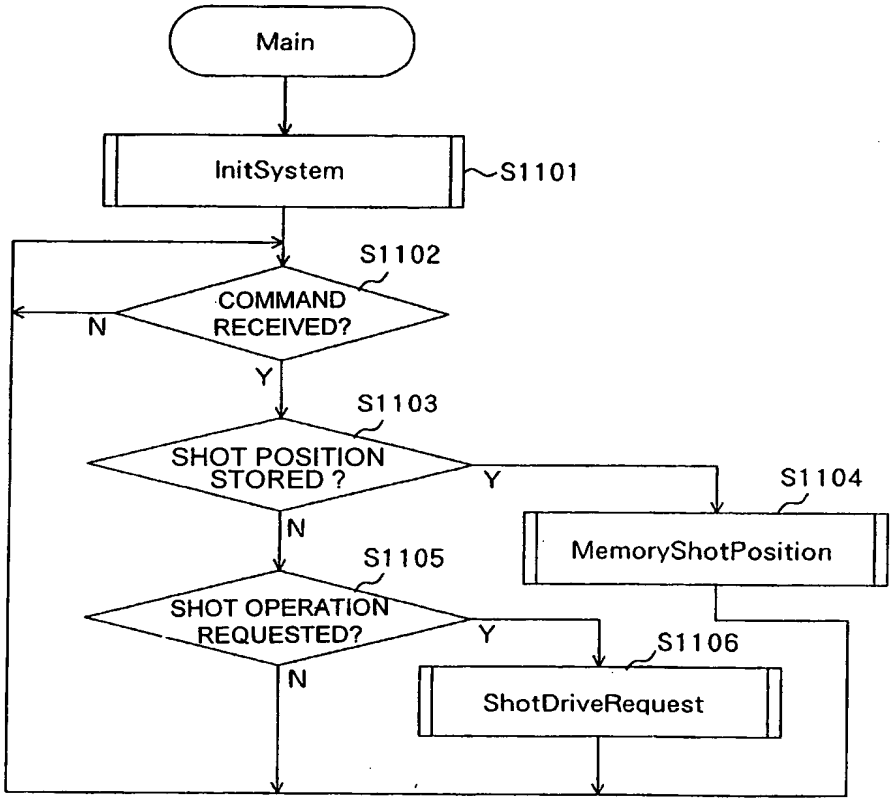

Main
InitSystem
S1101
S1102
COMMAND RECEIVED?
N
Y
S1103
SHOT POSITION STORED ?
Y
S1104
MemoryShotPosition
N
S1105
SHOT OPERATION REQUESTED?
Y
S1106
ShotDriveRequest
N

FIG. 9

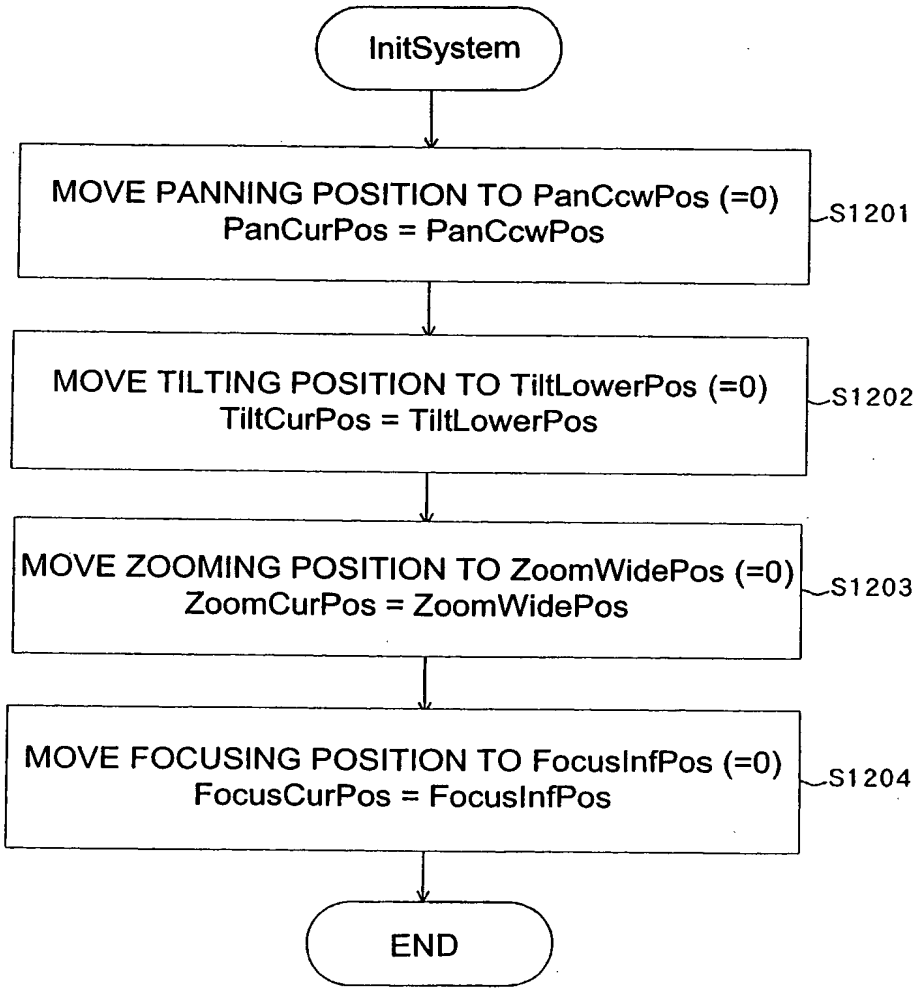

InitSystem
MOVE PANNING POSITION TO PanCcwPos (=0)
PanCurPos = PanCcwPos
S1201
MOVE TILTING POSITION TO TiltLowerPos (=0)
TiltCurPos = TiltLowerPos
S1202
MOVE ZOOMING POSITION TO ZoomWidePos (=0)
ZoomCurPos = ZoomWidePos
S1203
MOVE FOCUSING POSITION TO FocusInfPos (=0)
FocusCurPos = FocusInfPos
S1204
END

FIG. 10

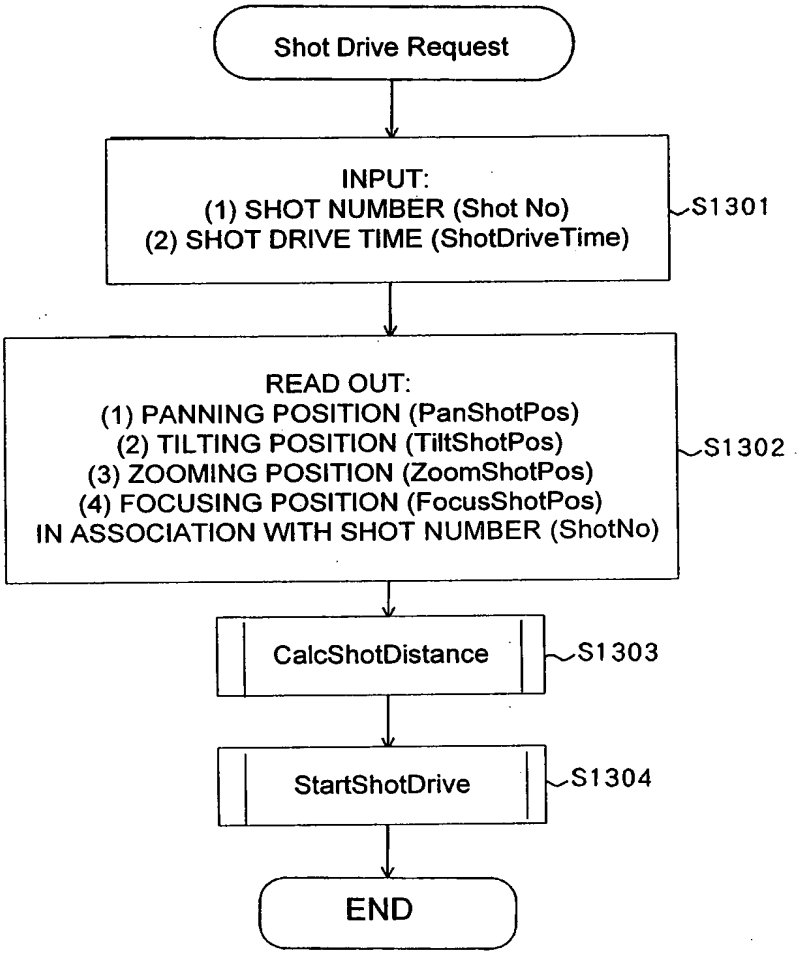

Shot Drive Request
INPUT:
(1) SHOT NUMBER (Shot No)
(2) SHOT DRIVE TIME (ShotDriveTime)
S1301
READ OUT:
(1) PANNING POSITION (PanShotPos)
(2) TILTING POSITION (TiltShotPos)
(3) ZOOMING POSITION (ZoomShotPos)
(4) FOCUSING POSITION (FocusShotPos)
IN ASSOCIATION WITH SHOT NUMBER (ShotNo)
S1302
CalcShotDistance
S1303
StartShotDrive
S1304
END

FIG. 11

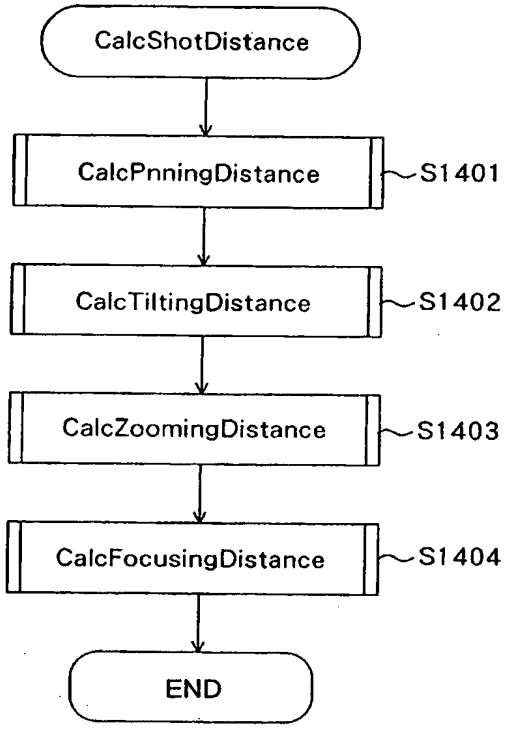

CalcShotDistance
CalcPnningDistance
S1401
CalcTiltingDistance
S1402
CalcZoomingDistance
S1403
CalcFocusingDistance
S1404
END

FIG. 12

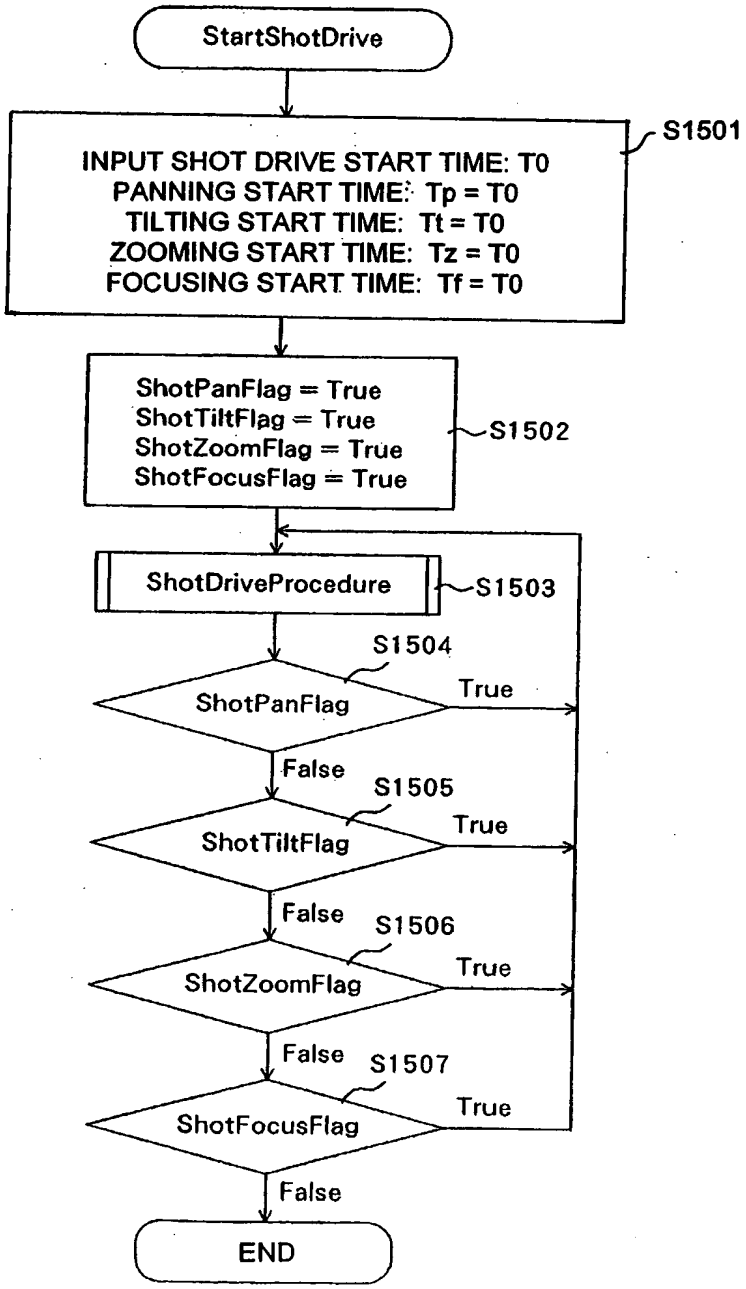

StartShotDrive
INPUT SHOT DRIVE START TIME: T0
PANNING START TIME: Tp = T0
TILTING START TIME: Tt = T0
ZOOMING START TIME: Tz = T0
FOCUSING START TIME: Tf = T0
S1501
ShotPanFlag = True
ShotTiltFlag = True
ShotZoomFlag = True
ShotFocusFlag = True
S1502
ShotDriveProcedure
S1503
S1504
ShotPanFlag
True
False
S1505
ShotTiltFlag
True
False
S1506
ShotZoomFlag
True
False
S1507
ShotFocusFlag
True
False
END

FIG. 13

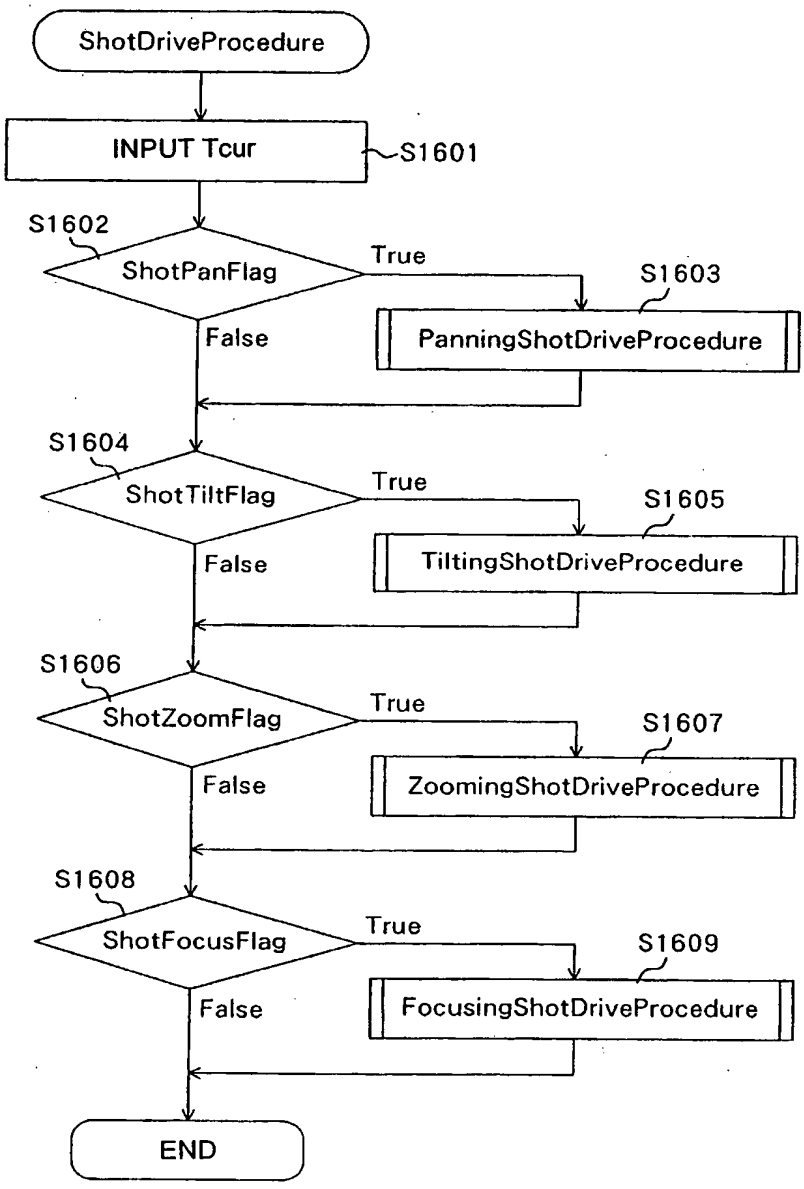

ShotDriveProcedure
INPUT Tcur
S1601
S1602
ShotPanFlag
True
S1603
PanningShotDriveProcedure
False
S1604
ShotTiltFlag
True
S1605
TiltingShotDriveProcedure
False
S1606
ShotZoomFlag
True
S1607
ZoomingShotDriveProcedure
False
S1608
ShotFocusFlag
True
S1609
FocusingShotDriveProcedure
False
END

FIG. 14

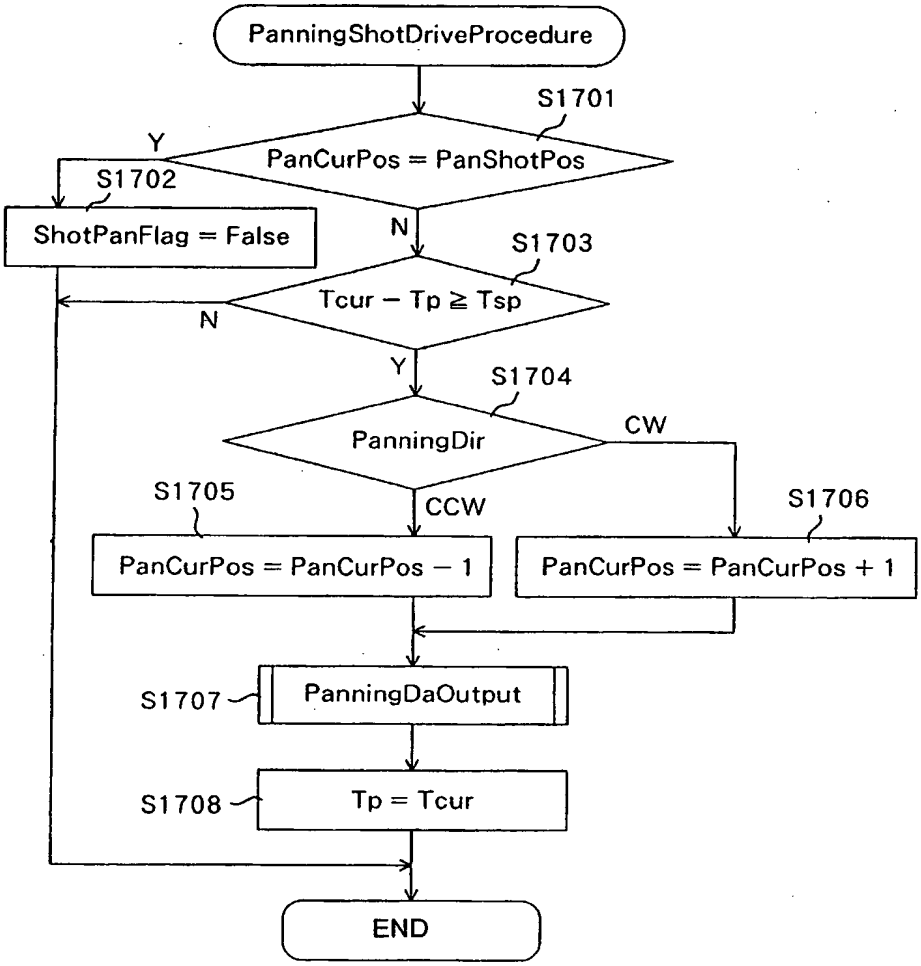

PanningShotDriveProcedure
S1701
PanCurPos = PanShotPos
Y
S1702
ShotPanFlag = False
N
S1703
Tcur − Tp ≧ Tsp
N
Y
S1704
PanningDir
CW
S1705
CCW
S1706
PanCurPos = PanCurPos − 1
PanCurPos = PanCurPos + 1
S1707
PanningDaOutput
S1708
Tp = Tcur
END

FIG. 15

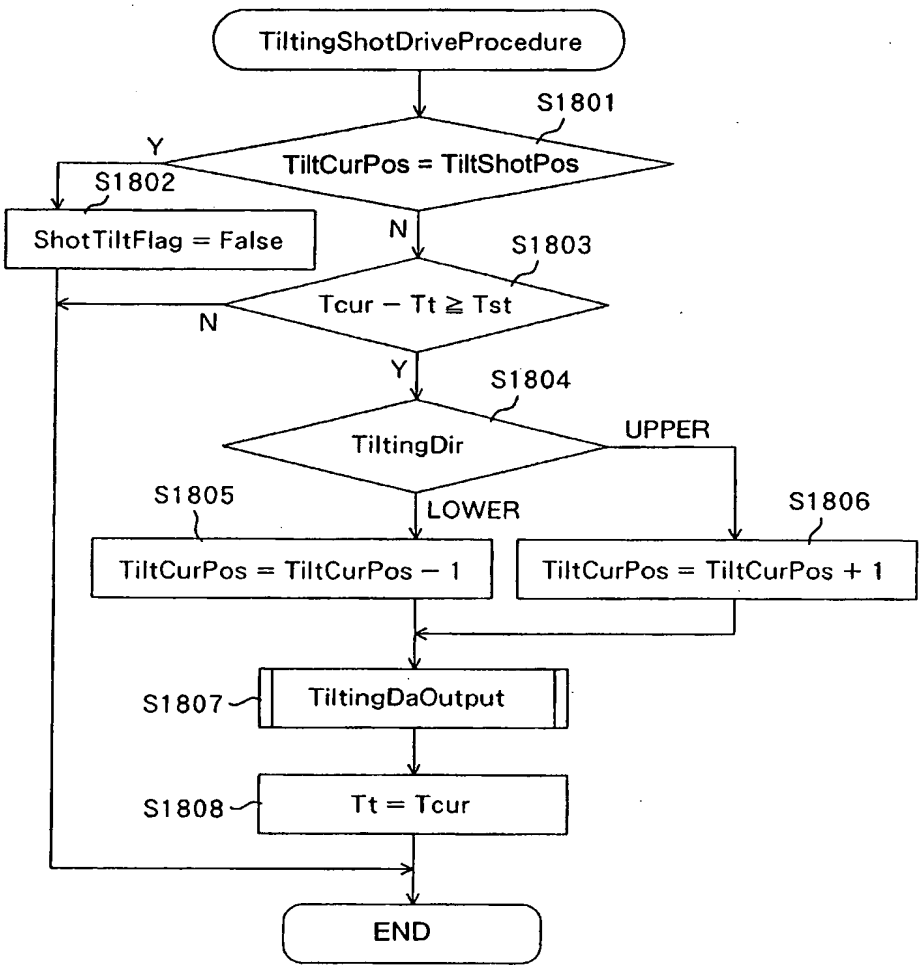

TiltingShotDriveProcedure
S1801
TiltCurPos = TiltShotPos
Y
S1802
ShotTiltFlag = False
N
S1803
Tcur − Tt ≧ Tst
N
Y
S1804
TiltingDir
UPPER
S1805
LOWER
S1806
TiltCurPos = TiltCurPos − 1
TiltCurPos = TiltCurPos + 1
S1807
TiltingDaOutput
S1808
Tt = Tcur
END

FIG. 16

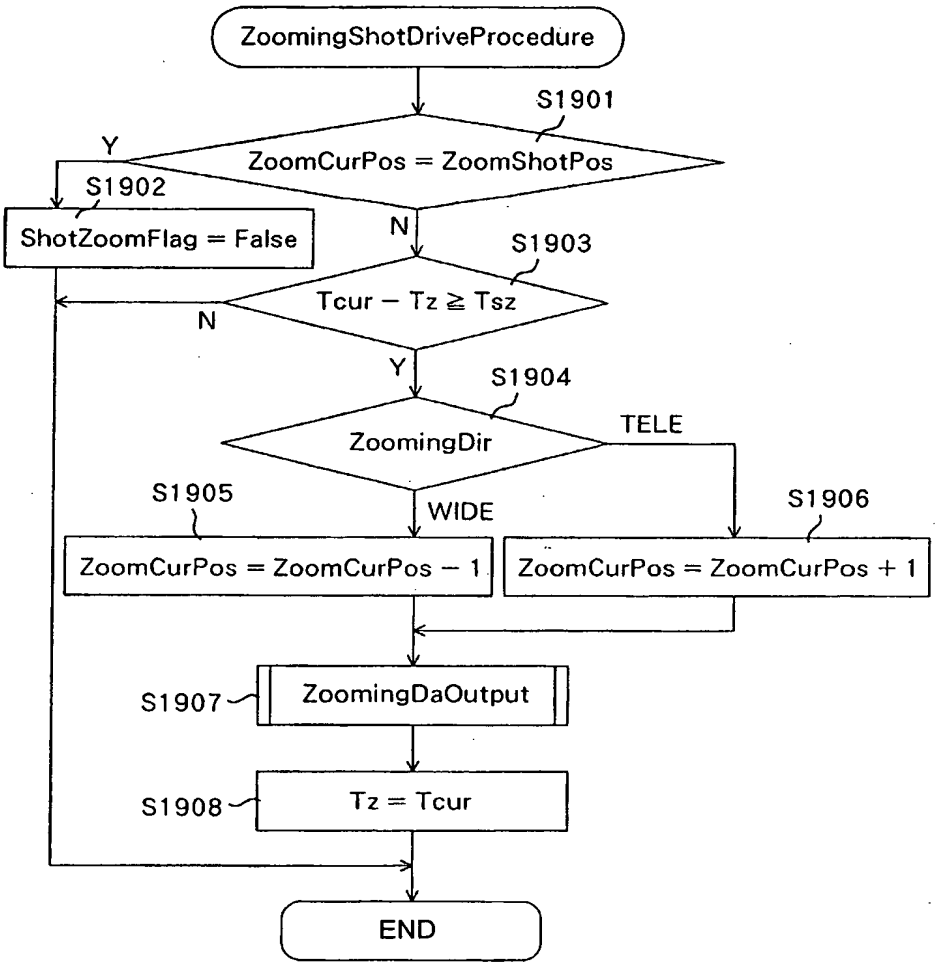

ZoomingShotDriveProcedure
S1901
ZoomCurPos = ZoomShotPos
Y
S1902
ShotZoomFlag = False
N
S1903
Tcur − Tz ≧ Tsz
N
Y
S1904
ZoomingDir
TELE
S1905
WIDE
S1906
ZoomCurPos = ZoomCurPos − 1
ZoomCurPos = ZoomCurPos + 1
S1907
ZoomingDaOutput
S1908
Tz = Tcur
END

FIG. 17

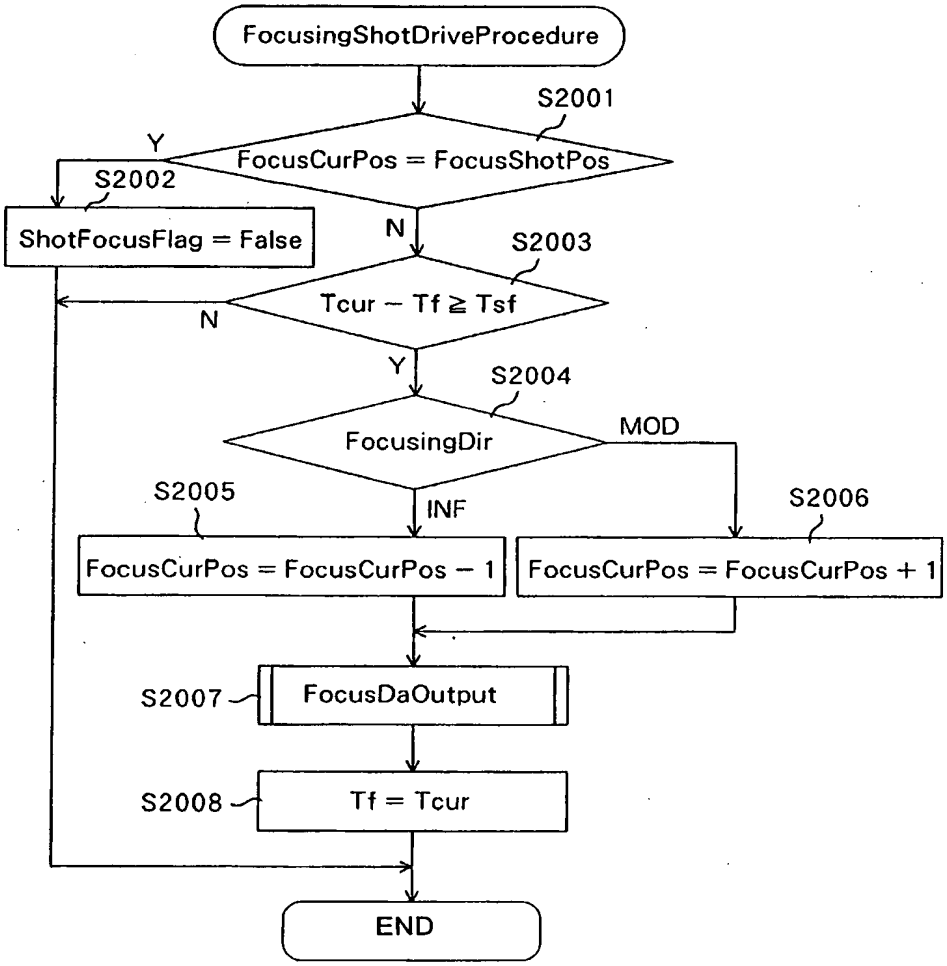

FocusingShotDriveProcedure
S2001
FocusCurPos = FocusShotPos
Y
S2002
ShotFocusFlag = False
N
S2003
Tcur − Tf ≧ Tsf
N
Y
S2004
FocusingDir
MOD
S2005
INF
S2006
FocusCurPos = FocusCurPos − 1
FocusCurPos = FocusCurPos + 1
S2007
FocusDaOutput
S2008
Tf = Tcur
END

FIG. 18

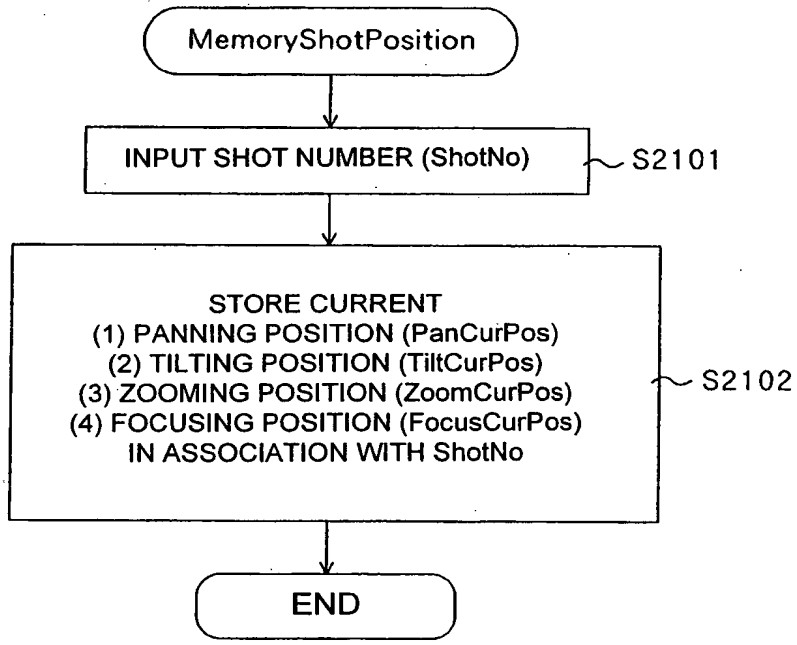

MemoryShotPosition
INPUT SHOT NUMBER (ShotNo)
S2101
STORE CURRENT
(1) PANNING POSITION (PanCurPos)
(2) TILTING POSITION (TiltCurPos)
(3) ZOOMING POSITION (ZoomCurPos)
(4) FOCUSING POSITION (FocusCurPos)
IN ASSOCIATION WITH ShotNo
S2102
END

FIG. 19

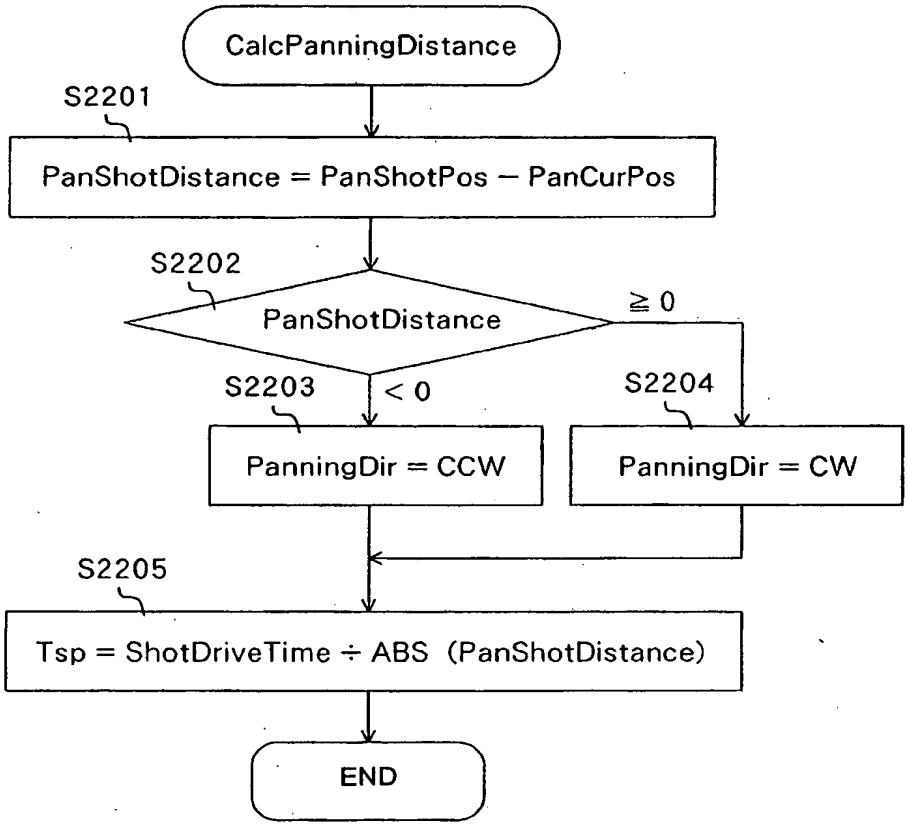

CalcPanningDistance
S2201
PanShotDistance = PanShotPos − PanCurPos
S2202
PanShotDistance
≧ 0
S2203
< 0
S2204
PanningDir = CCW
PanningDir = CW
S2205
Tsp = ShotDriveTime ÷ ABS (PanShotDistance)
END

FIG. 20

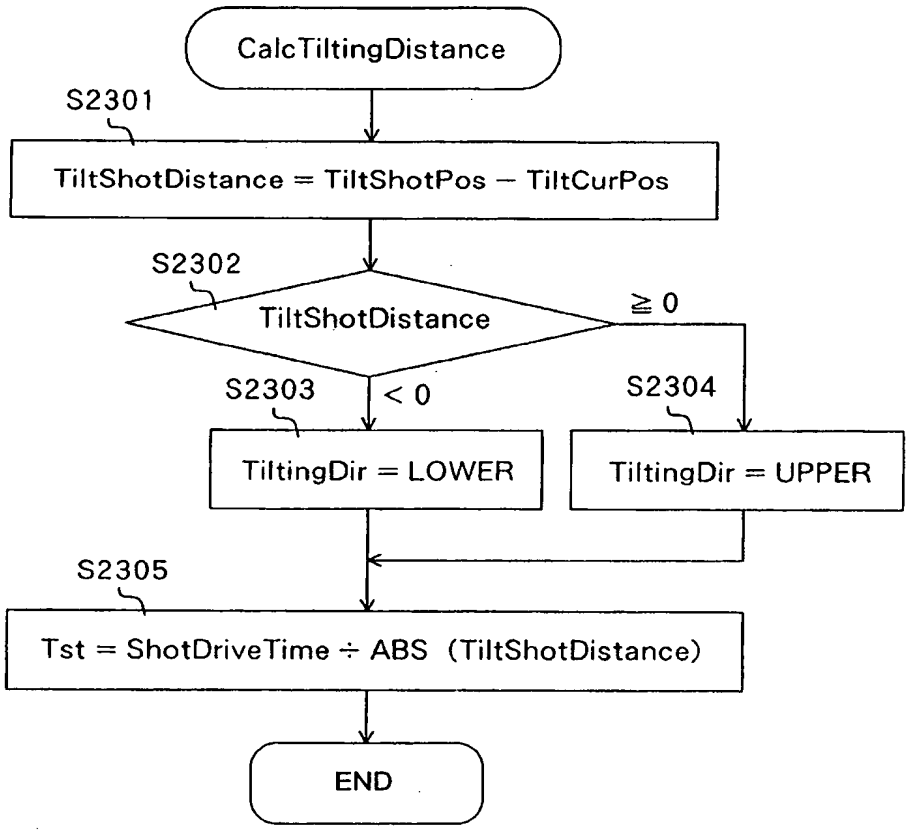

CalcTiltingDistance
S2301
TiltShotDistance = TiltShotPos − TiltCurPos
S2302
TiltShotDistance
≧ 0
S2303
< 0
S2304
TiltingDir = LOWER
TiltingDir = UPPER
S2305
Tst = ShotDriveTime ÷ ABS (TiltShotDistance)
END

FIG. 21

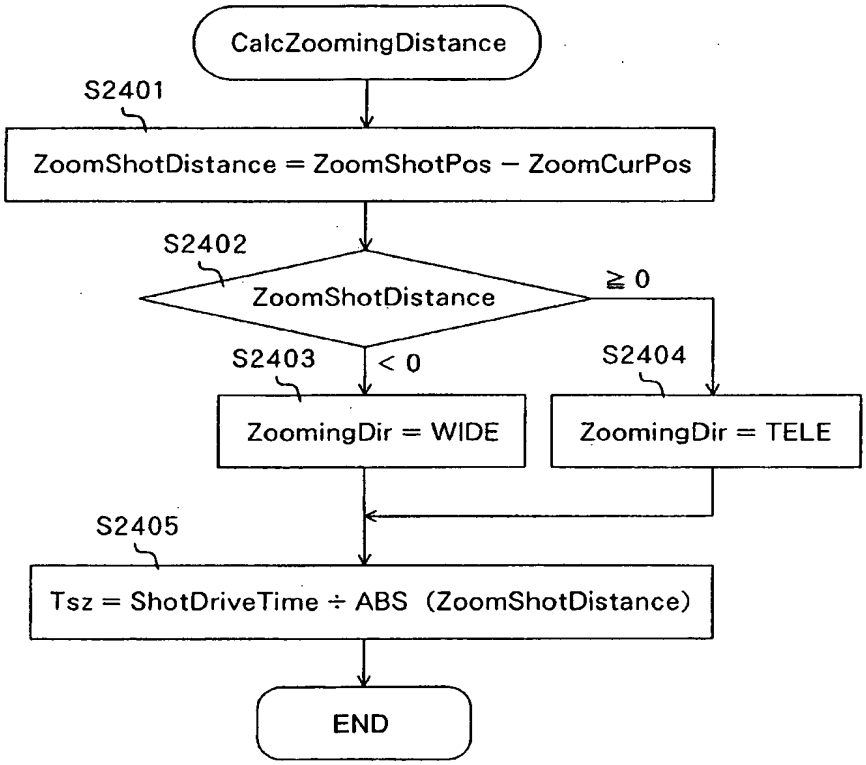

CalcZoomingDistance
S2401
ZoomShotDistance = ZoomShotPos − ZoomCurPos
S2402
ZoomShotDistance
≧ 0
S2403
< 0
S2404
ZoomingDir = WIDE
ZoomingDir = TELE
S2405
Tsz = ShotDriveTime ÷ ABS (ZoomShotDistance)
END

FIG. 22

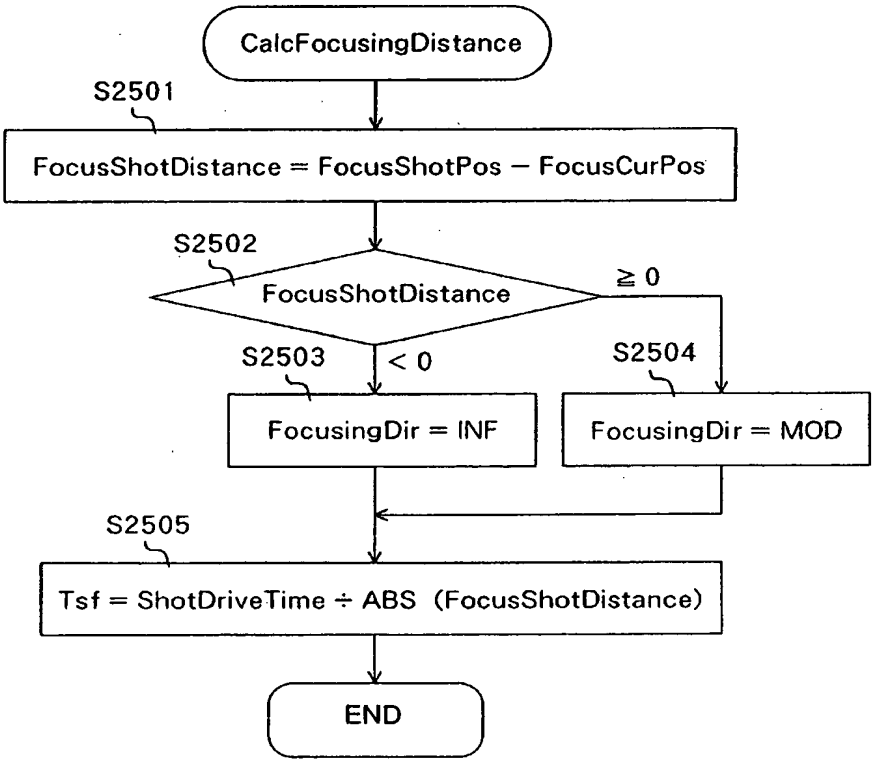

CalcFocusingDistance
S2501
FocusShotDistance = FocusShotPos − FocusCurPos
S2502
FocusShotDistance
≧ 0
S2503
< 0
S2504
FocusingDir = INF
FocusingDir = MOD
S2505
Tsf = ShotDriveTime ÷ ABS (FocusShotDistance)
END

FIG. 23

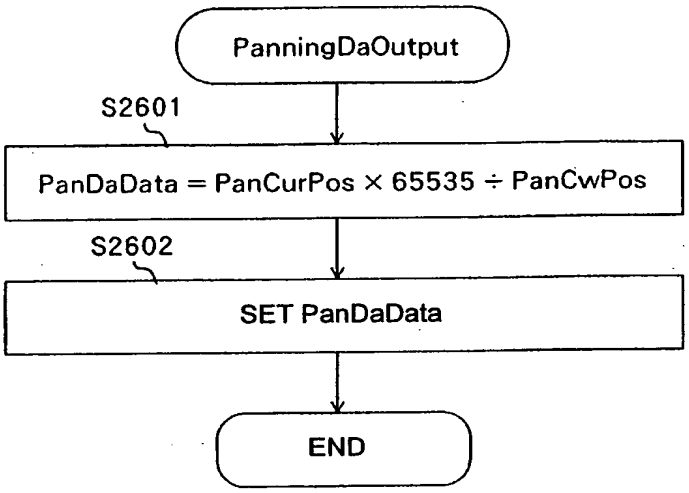

PanningDaOutput
S2601
PanDaData = PanCurPos × 65535 ÷ PanCwPos
S2602
SET PanDaData
END

FIG. 24

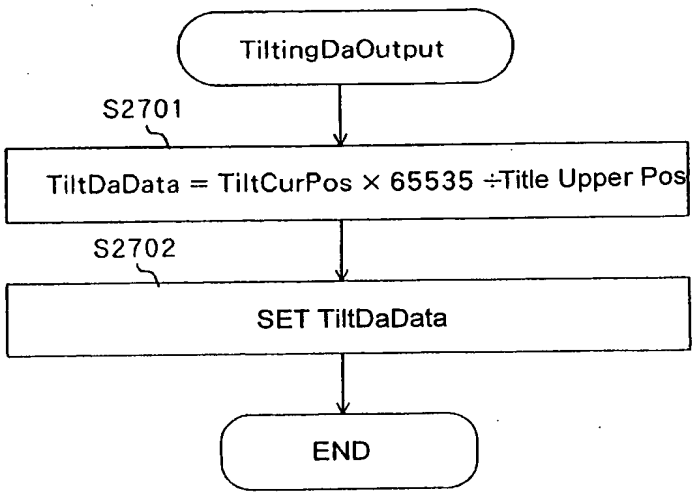

TiltingDaOutput
S2701
TiltDaData = TiltCurPos × 65535 ÷Title Upper Pos
S2702
SET TiltDaData
END

FIG. 25

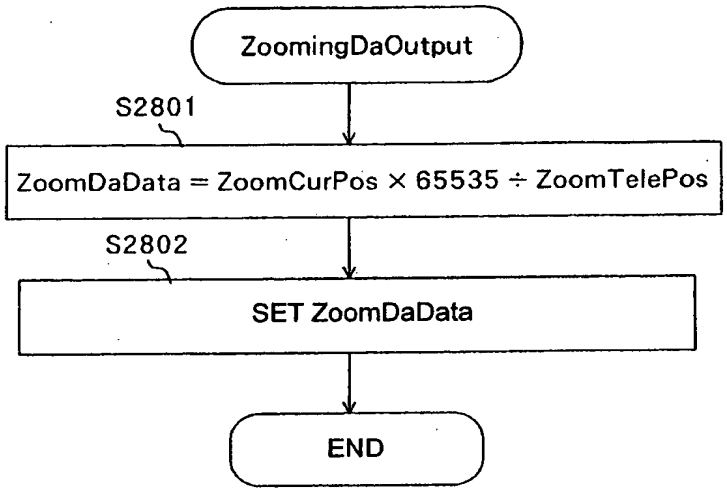

ZoomingDaOutput
S2801
ZoomDaData = ZoomCurPos × 65535 ÷ ZoomTelePos
S2802
SET ZoomDaData
END

FIG. 26

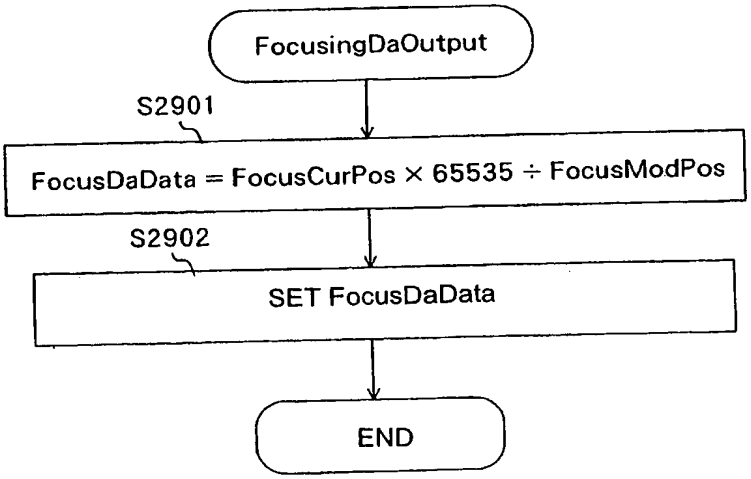

FocusingDaOutput
S2901
FocusDaData = FocusCurPos × 65535 ÷ FocusModPos
S2902
SET FocusDaData
END

FIG. 27

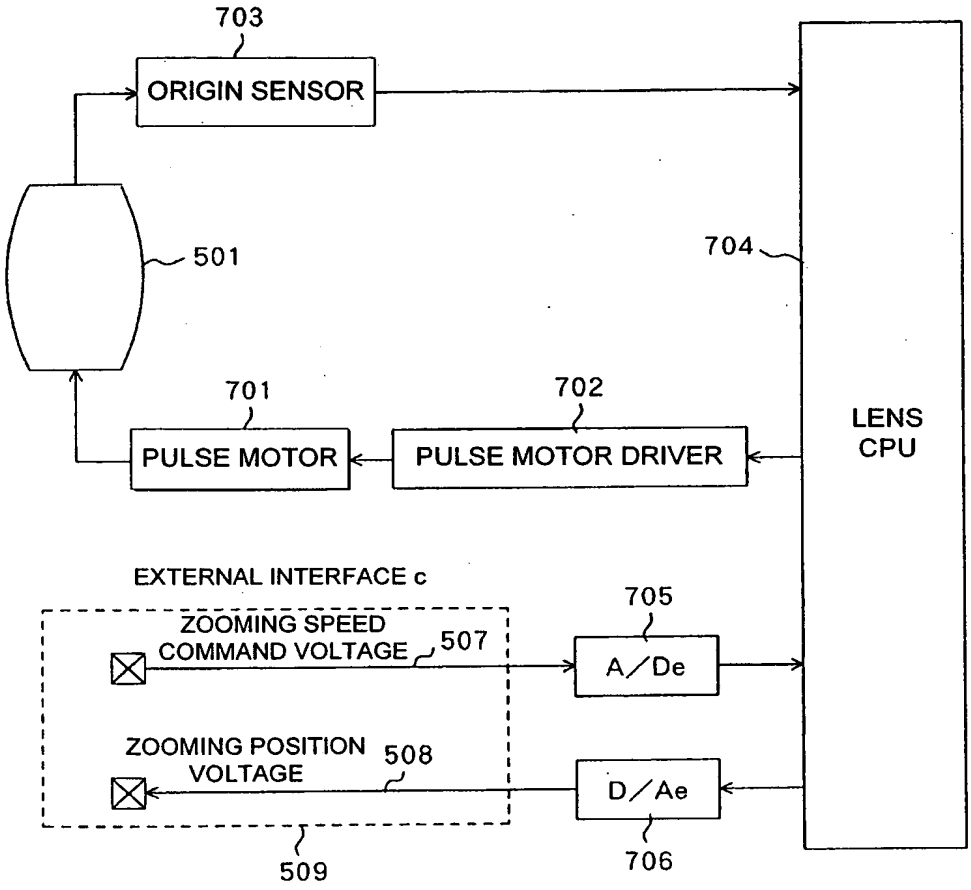

703
ORIGIN SENSOR
501
704
701
PULSE MOTOR
702
PULSE MOTOR DRIVER
LENS CPU
EXTERNAL INTERFACE c
ZOOMING SPEED COMMAND VOLTAGE
507
705
A/De
ZOOMING POSITION VOLTAGE
508
D/Ae
509
706

FIG. 28

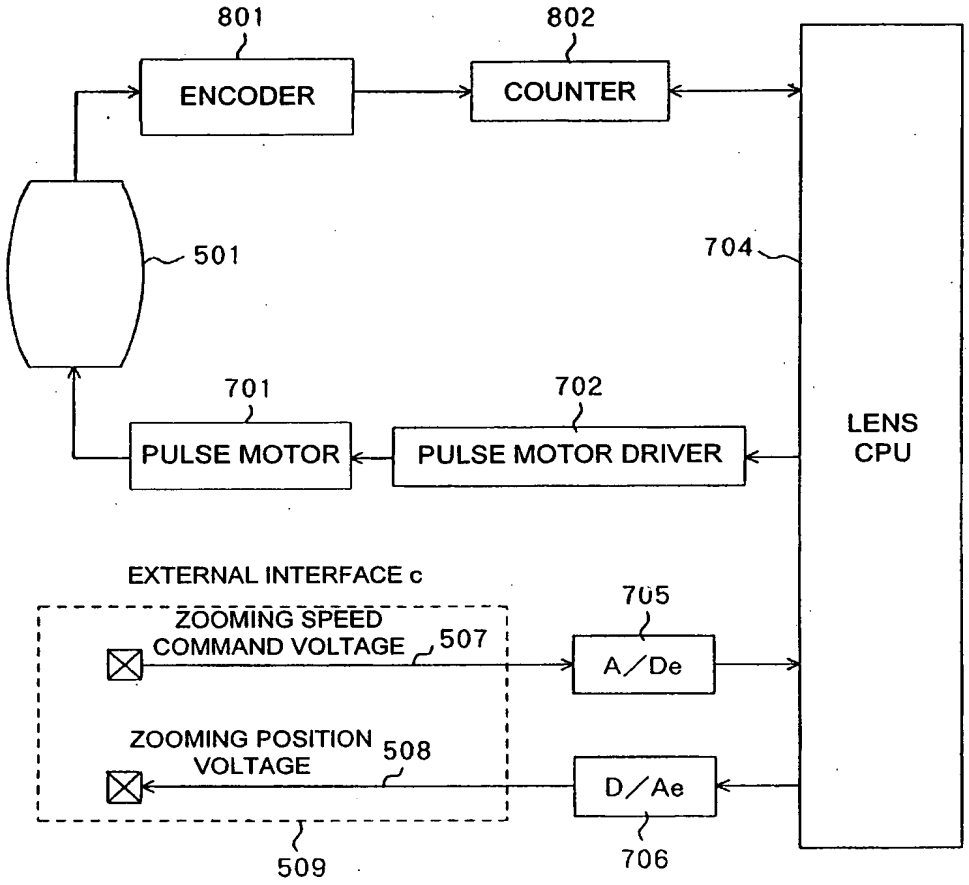

801
ENCODER
802
COUNTER
501
704
701
PULSE MOTOR
702
PULSE MOTOR DRIVER
LENS CPU
EXTERNAL INTERFACE c
ZOOMING SPEED COMMAND VOLTAGE
507
705
A/De
ZOOMING POSITION VOLTAGE
508
D/Ae
509
706

FIG. 29

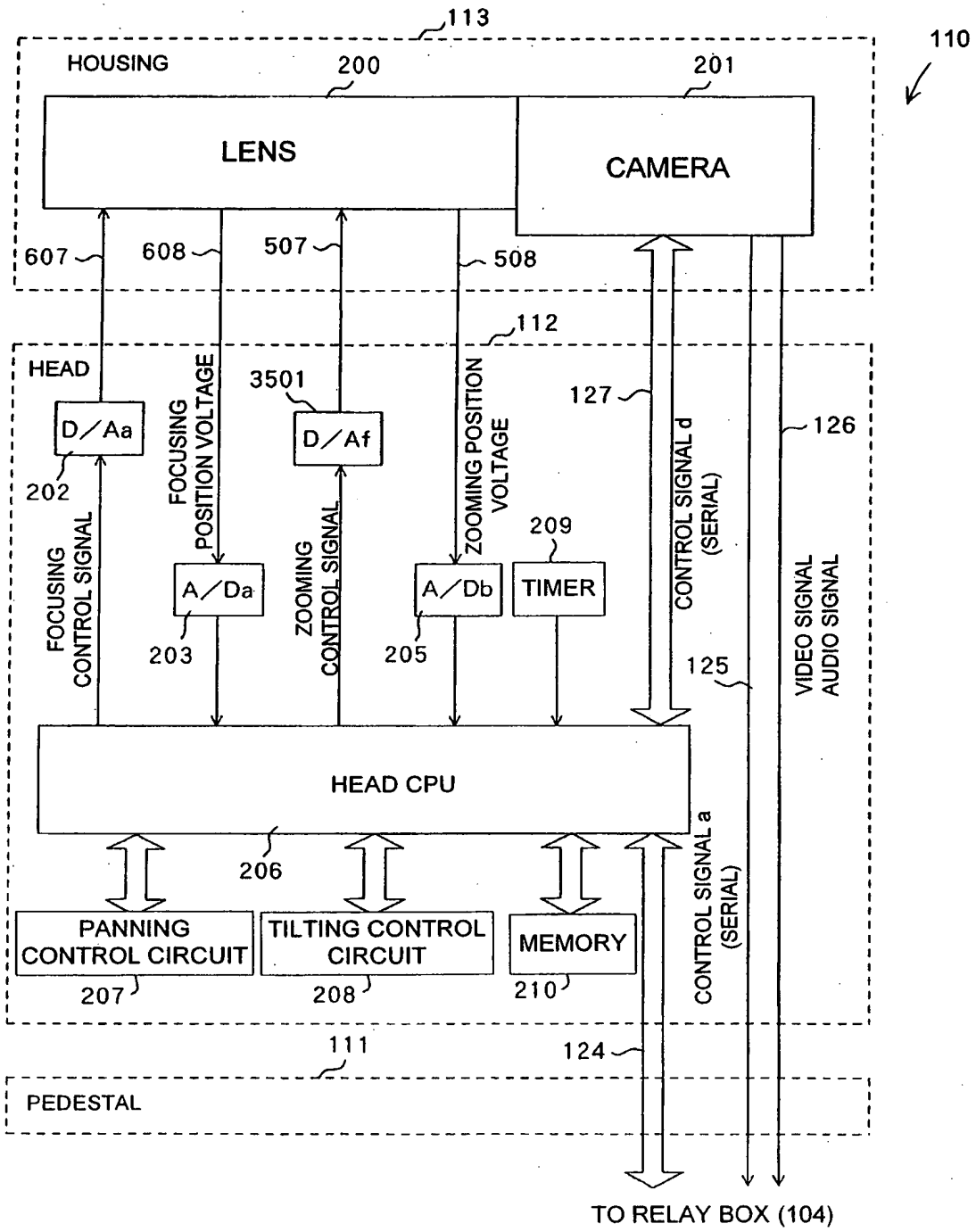

113
110
HOUSING
200
201
LENS
CAMERA
607
608
507
508
112
HEAD
3501
127
126
D/Aa
D/Af
202
FOCUSING POSITION VOLTAGE
ZOOMING POSITION VOLTAGE
CONTROL SIGNAL d (SERIAL)
VIDEO SIGNAL AUDIO SIGNAL
209
FOCUSING CONTROL SIGNAL
ZOOMING CONTROL SIGNAL
A/Da
A/Db
TIMER
203
205
125
HEAD CPU
206
CONTROL SIGNAL a (SERIAL)
PANNING CONTROL CIRCUIT
TILTING CONTROL CIRCUIT
MEMORY
207
208
210
111
124
PEDESTAL
TO RELAY BOX (104)

FIG. 30

FIG. 31

TABLE No.	8 BIT A/D VALUE	ZOOMING SPEED (PPS)	TOTAL REGION DRIVE TIME (SEC)	SPEED COMMAND VALUE
8	0x79~	2000	2.500	0x7C
7	0x70~0x78	1300	3.846	0x74
6	0x69~0x6F	900	5.556	0x6C
5	0x60~0x68	600	8.333	0x64
4	0x50~0x5F	400	12.500	0x57
3	0x41~0x4F	250	20.000	0x48
2	0x39~0x40	150	33.333	0x3C
1	0x21~0x38	100	50.000	0x2C
0	0x00~0x20	0	STOP	0x00

- NUMBER OF DRIVE PULSES OVER ENTIRE MOVABLE REGION OF ZOOM LENS: 5000
- USING 8-BIT A/D CONVERSION
  0x00~0x7F: WIDE DIRECTION
  0x80~0XFF: TELE DIRECTION

THE ABOVE TABLE SHOWS DIFFERENTIAL DATA WITH 0x80 AS THE CENTER POSITION

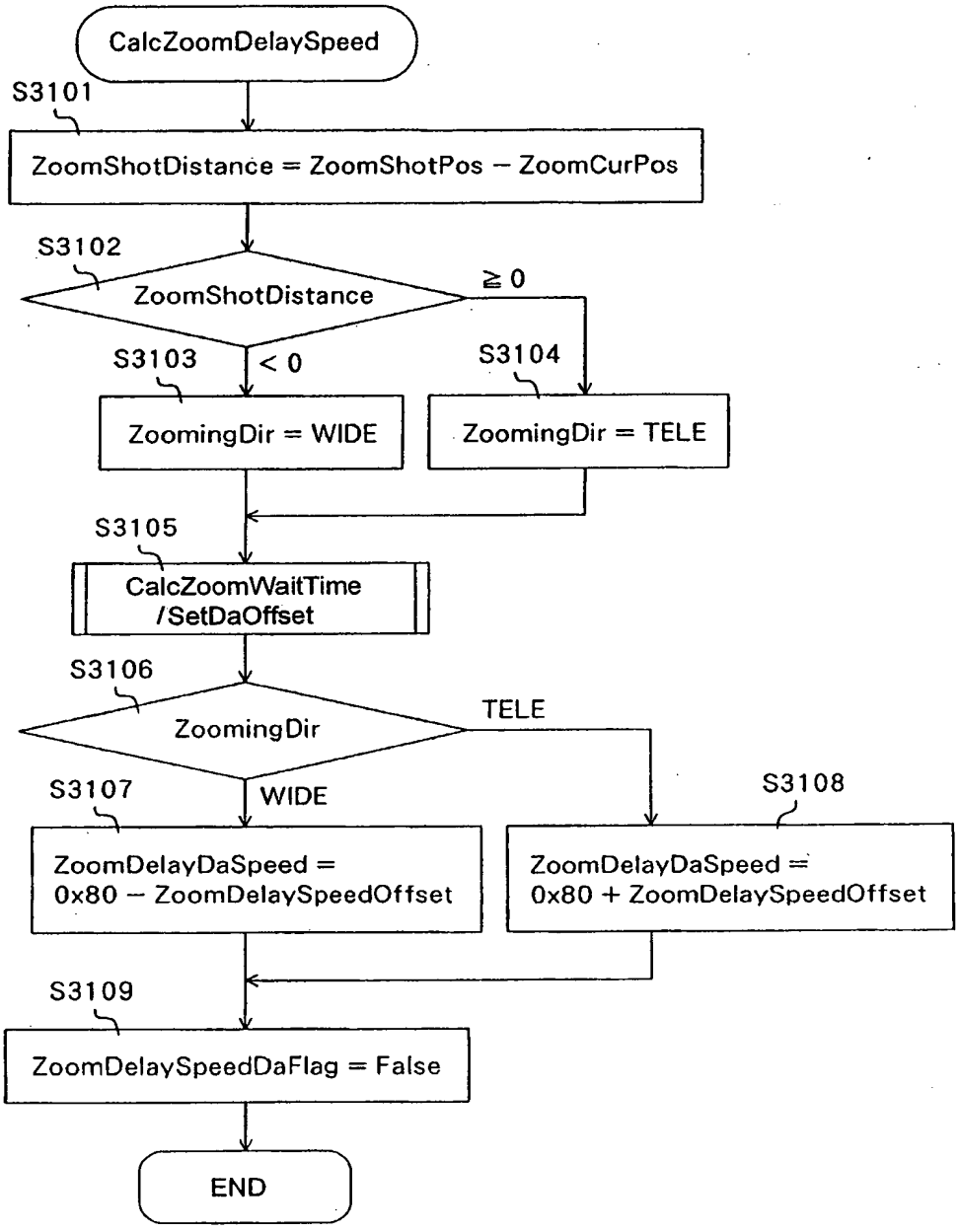

CalcZoomDelaySpeed
S3101
ZoomShotDistance = ZoomShotPos − ZoomCurPos
S3102
ZoomShotDistance
≧ 0
S3103
< 0
S3104
ZoomingDir = WIDE
ZoomingDir = TELE
S3105
CalcZoomWaitTime
/SetDaOffset
S3106
ZoomingDir
TELE
S3107
WIDE
S3108
ZoomDelayDaSpeed =
0x80 − ZoomDelaySpeedOffset
ZoomDelayDaSpeed =
0x80 + ZoomDelaySpeedOffset
S3109
ZoomDelaySpeedDaFlag = False
END

FIG. 32

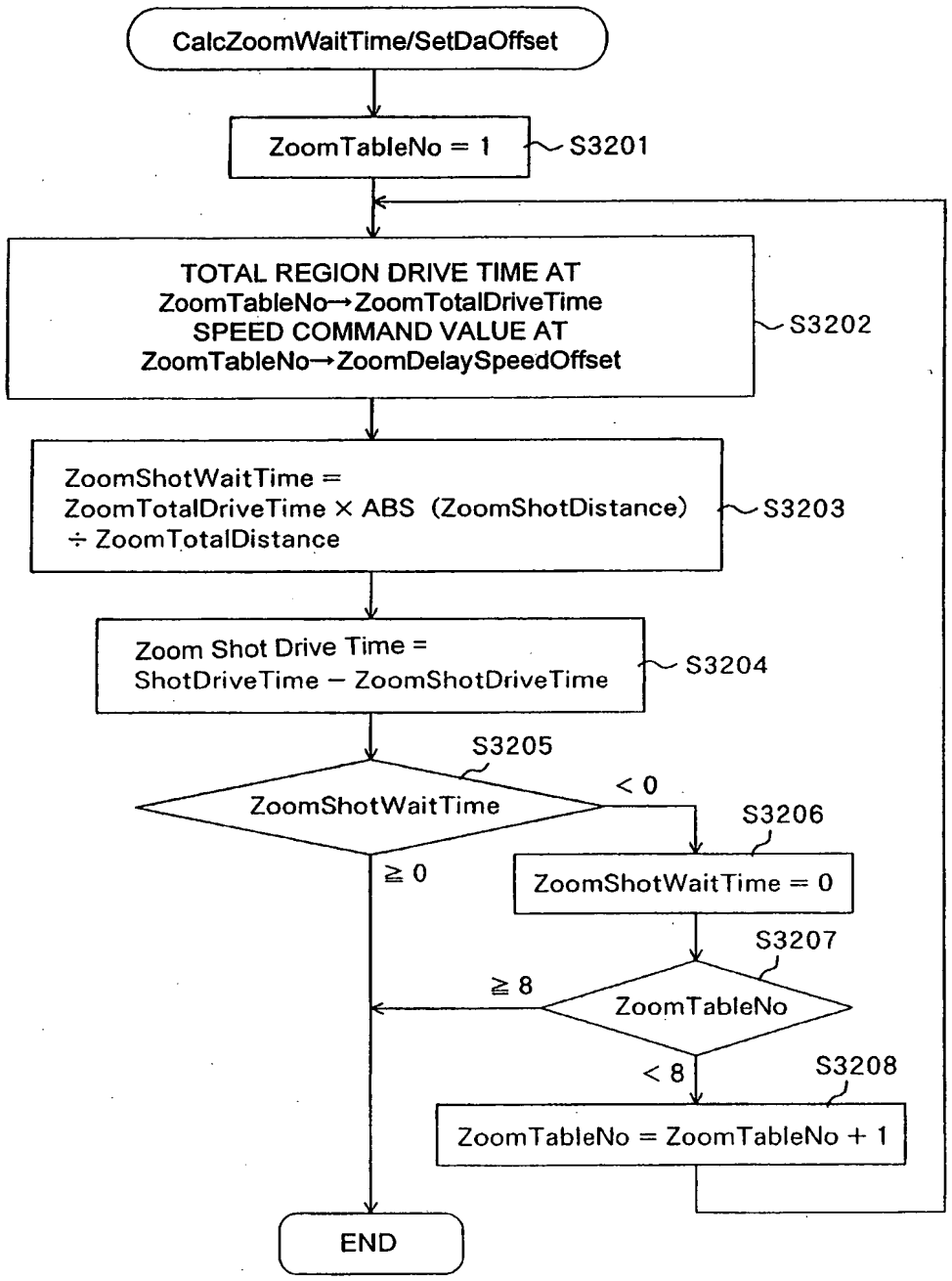

CalcZoomWaitTime/SetDaOffset
ZoomTableNo = 1
S3201
TOTAL REGION DRIVE TIME AT
ZoomTableNo→ZoomTotalDriveTime
SPEED COMMAND VALUE AT
ZoomTableNo→ZoomDelaySpeedOffset
S3202
ZoomShotWaitTime =
ZoomTotalDriveTime × ABS (ZoomShotDistance)
÷ ZoomTotalDistance
S3203
Zoom Shot Drive Time =
ShotDriveTime − ZoomShotDriveTime
S3204
S3205
ZoomShotWaitTime
< 0
S3206
ZoomShotWaitTime = 0
≧ 0
S3207
≧ 8
ZoomTableNo
< 8
S3208
ZoomTableNo = ZoomTableNo + 1
END

FIG. 33

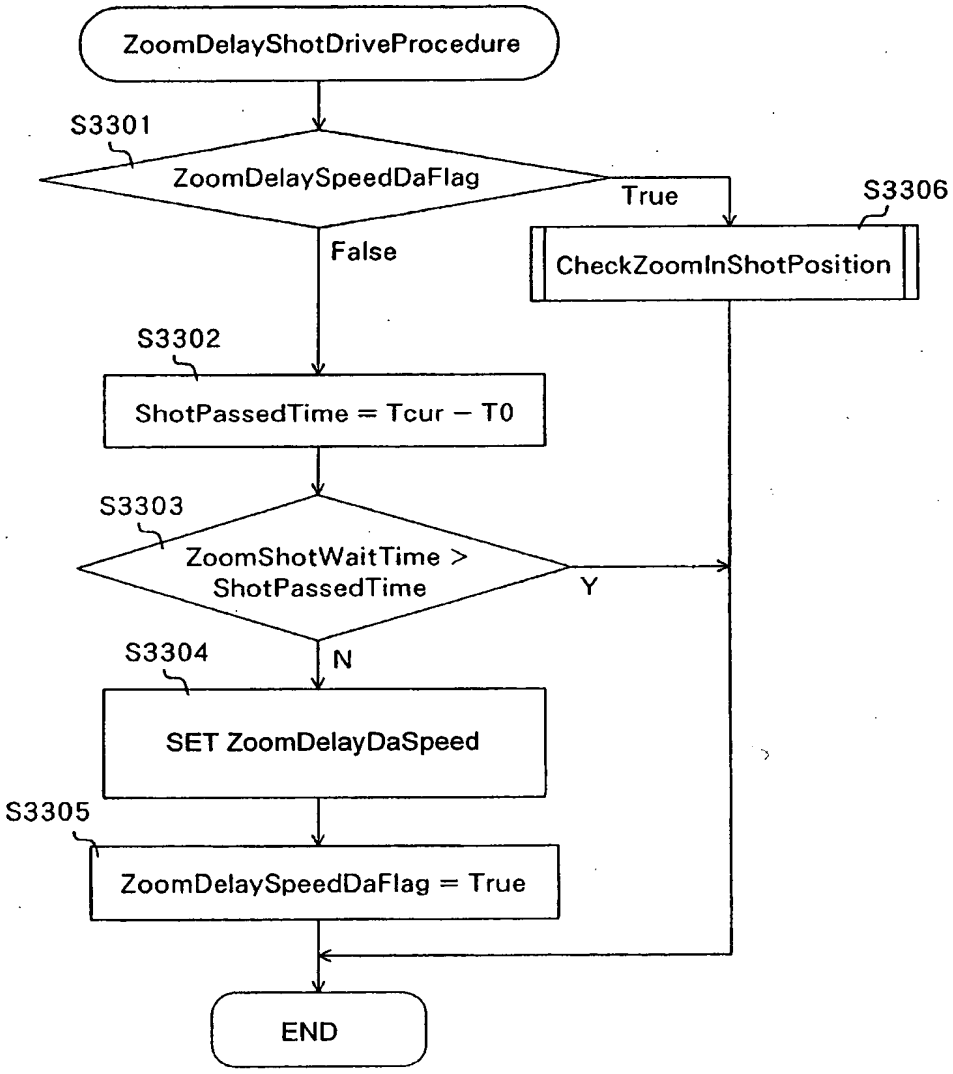

ZoomDelayShotDriveProcedure
S3301
ZoomDelaySpeedDaFlag
True
S3306
CheckZoomInShotPosition
False
S3302
ShotPassedTime = Tcur − T0
S3303
ZoomShotWaitTime > ShotPassedTime
Y
N
S3304
SET ZoomDelayDaSpeed
S3305
ZoomDelaySpeedDaFlag = True
END

FIG. 34

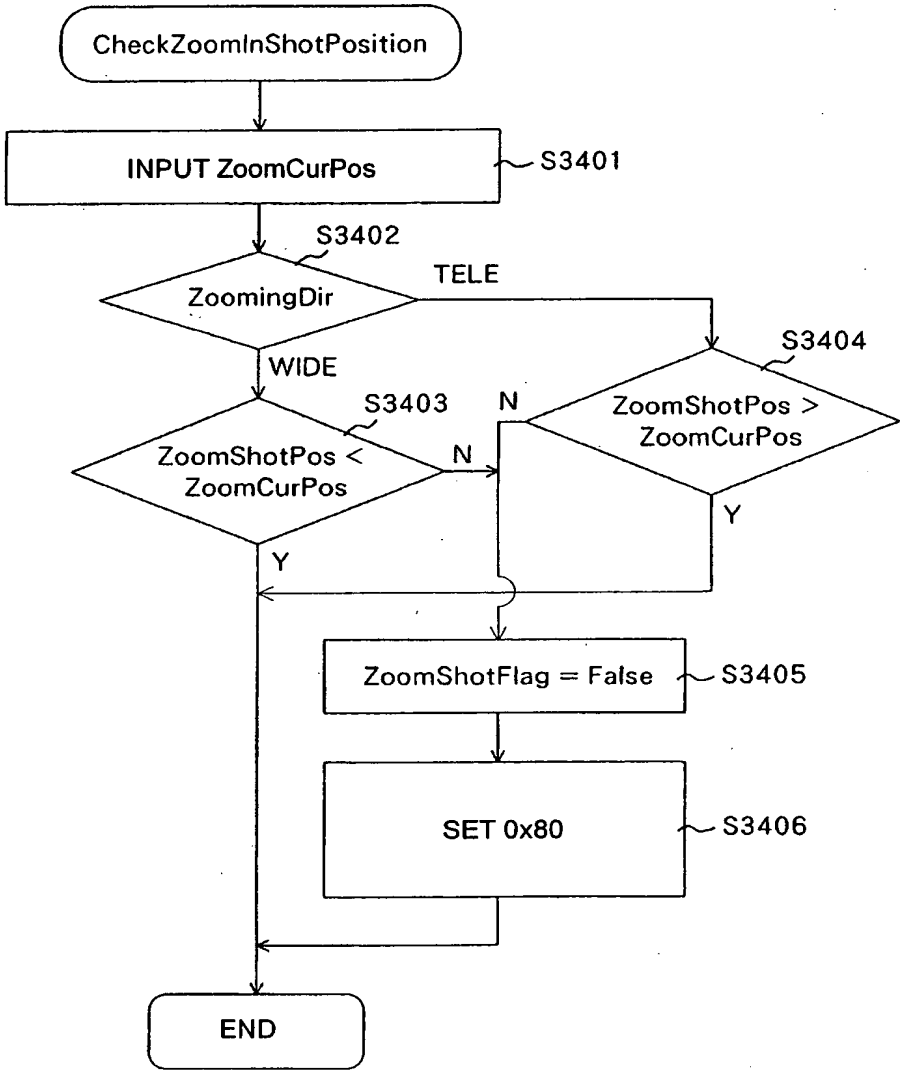

CheckZoomInShotPosition
INPUT ZoomCurPos
S3401
S3402
ZoomingDir
TELE
WIDE
S3404
ZoomShotPos > ZoomCurPos
N
Y
S3403
ZoomShotPos < ZoomCurPos
N
Y
ZoomShotFlag = False
S3405
SET 0x80
S3406
END

FIG. 35

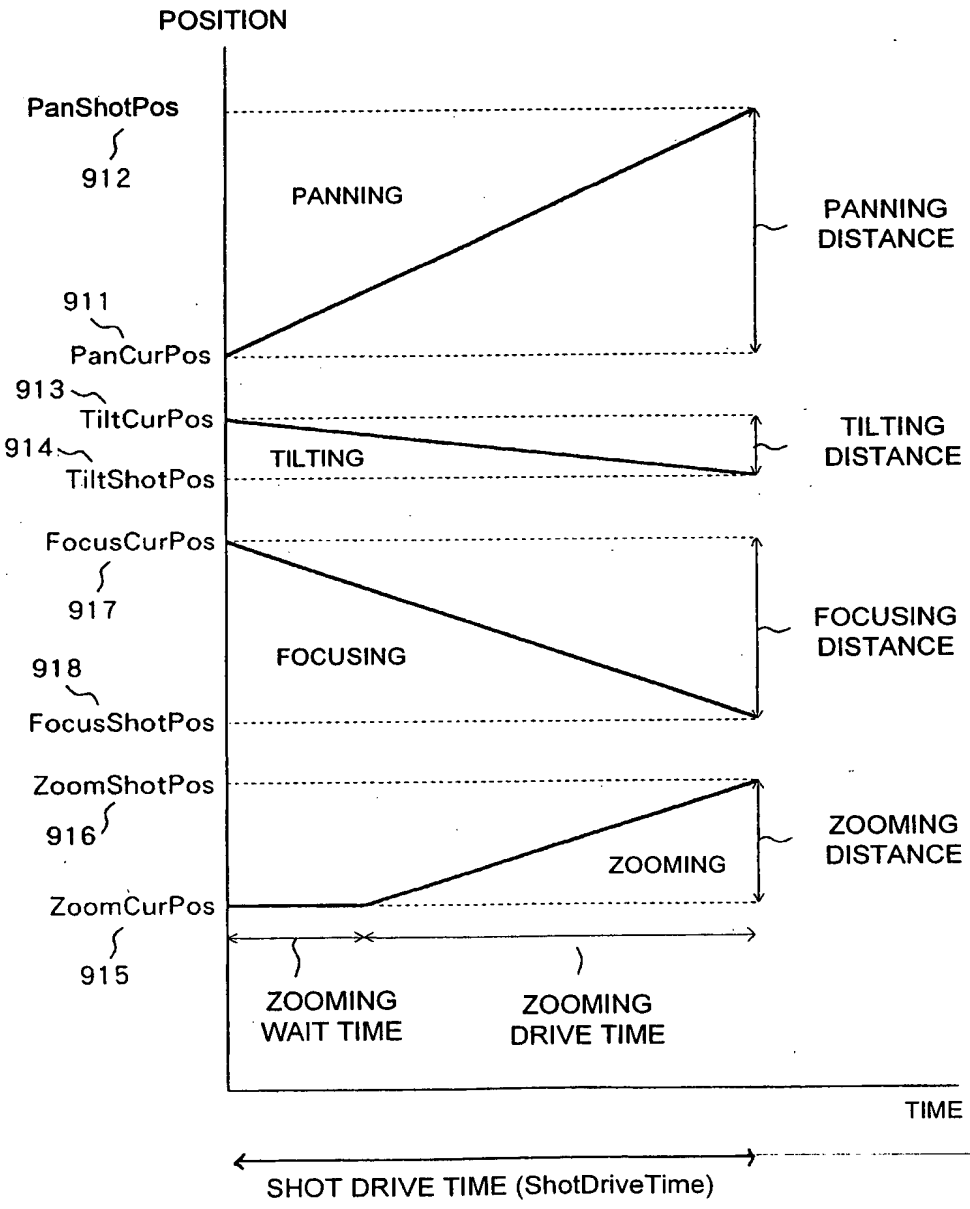

POSITION
PanShotPos
912
PANNING
PANNING DISTANCE
911
PanCurPos
913
TiltCurPos
914
TiltShotPos
TILTING
TILTING DISTANCE
FocusCurPos
917
FOCUSING
FOCUSING DISTANCE
918
FocusShotPos
ZoomShotPos
916
ZOOMING
ZOOMING DISTANCE
ZoomCurPos
915
ZOOMING WAIT TIME
ZOOMING DRIVE TIME
TIME
SHOT DRIVE TIME (ShotDriveTime)

FIG. 36

FIG. 37A

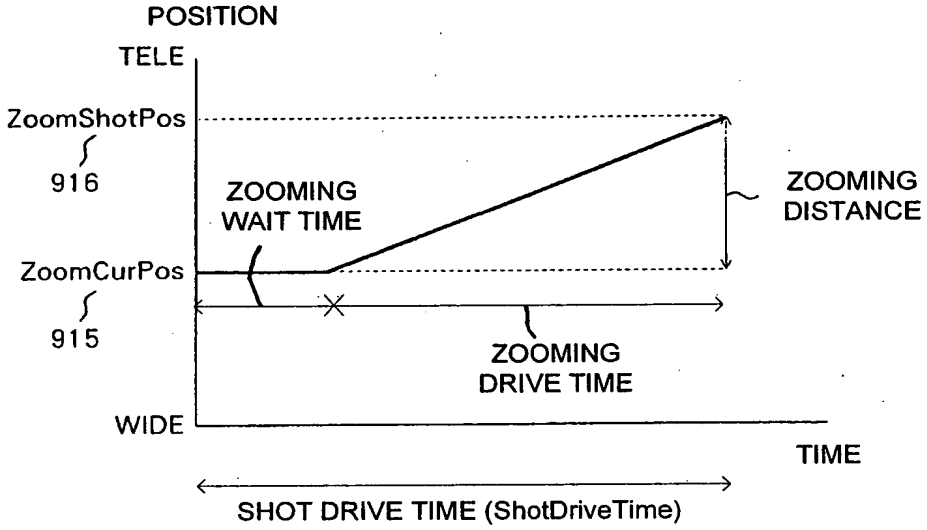
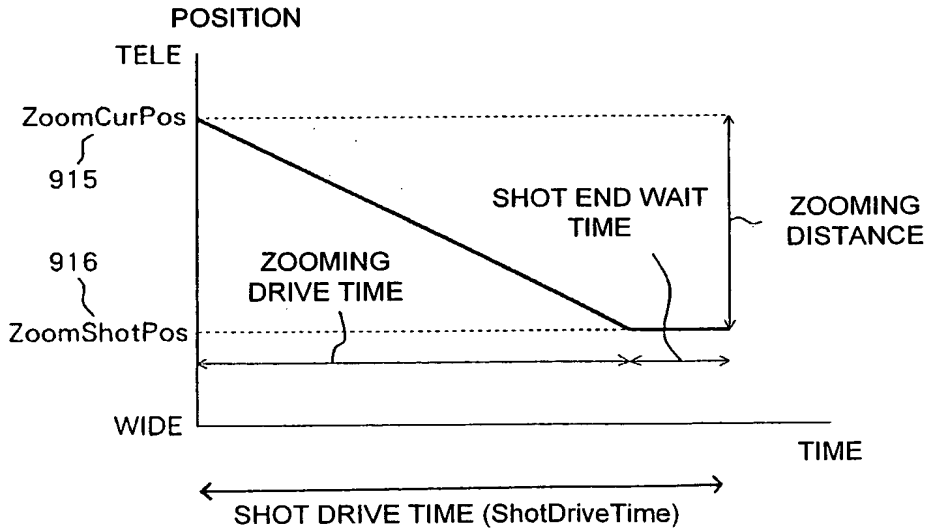


FIG. 37B



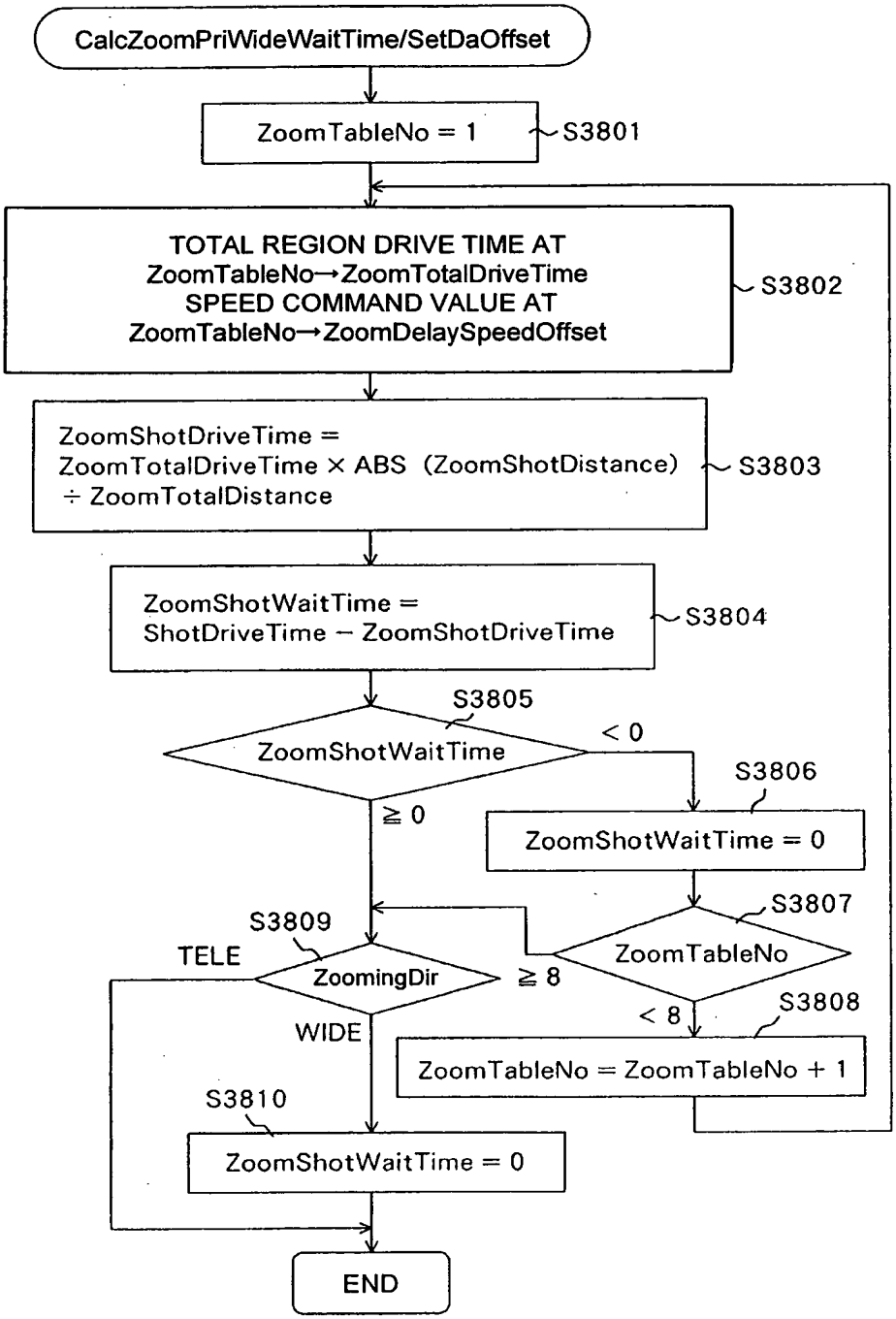

CalcZoomPriWideWaitTime/SetDaOffset
ZoomTableNo = 1
S3801
TOTAL REGION DRIVE TIME AT
ZoomTableNo→ZoomTotalDriveTime
SPEED COMMAND VALUE AT
ZoomTableNo→ZoomDelaySpeedOffset
S3802
ZoomShotDriveTime =
ZoomTotalDriveTime × ABS (ZoomShotDistance)
÷ ZoomTotalDistance
S3803
ZoomShotWaitTime =
ShotDriveTime − ZoomShotDriveTime
S3804
S3805
ZoomShotWaitTime
< 0
≧ 0
S3806
ZoomShotWaitTime = 0
S3807
ZoomTableNo
≧ 8
< 8
S3808
ZoomTableNo = ZoomTableNo + 1
S3809
TELE
ZoomingDir
WIDE
S3810
ZoomShotWaitTime = 0
END

FIG. 38

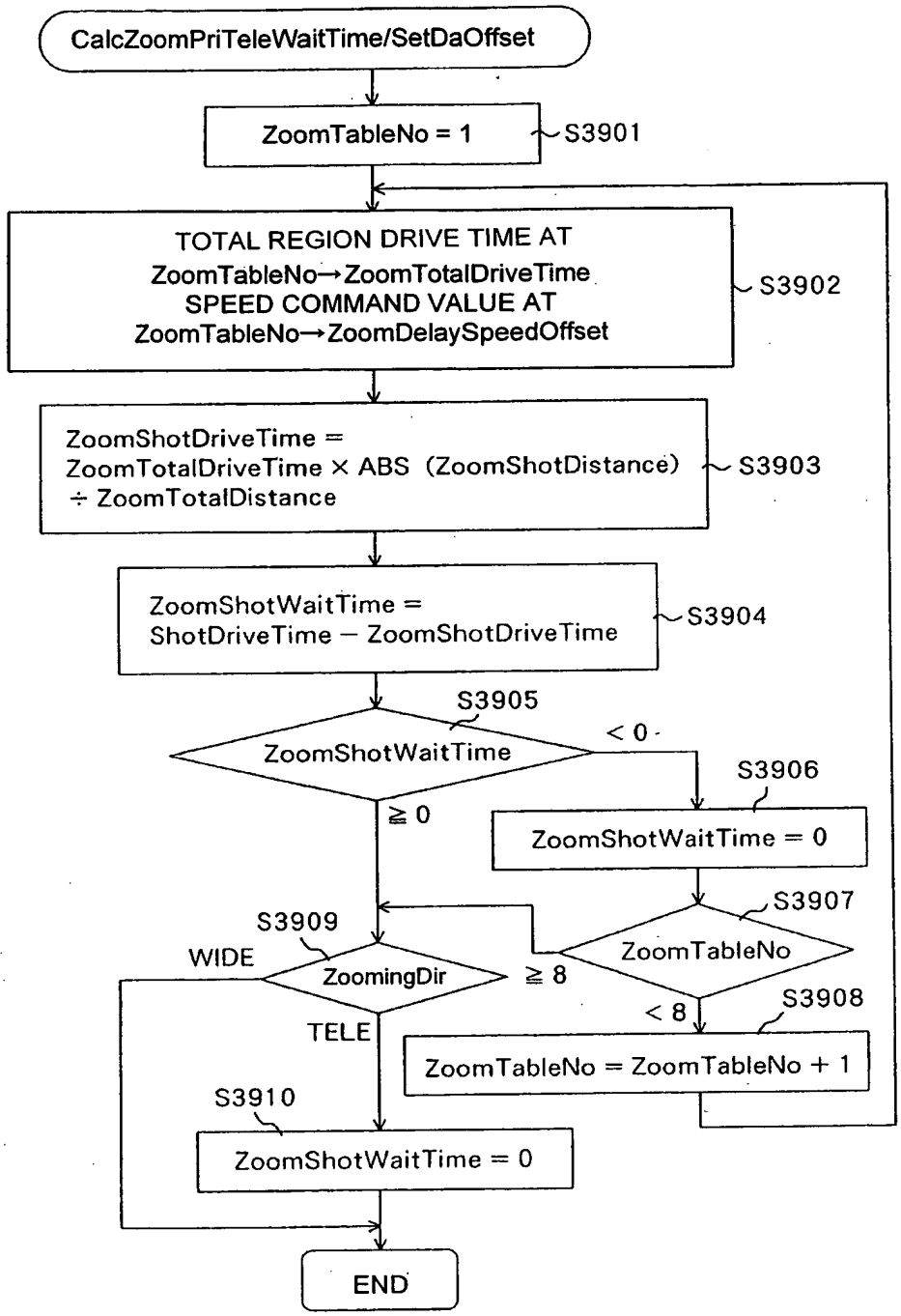

CalcZoomPriTeleWaitTime/SetDaOffset
ZoomTableNo = 1
S3901
TOTAL REGION DRIVE TIME AT
ZoomTableNo→ZoomTotalDriveTime
SPEED COMMAND VALUE AT
ZoomTableNo→ZoomDelaySpeedOffset
S3902
ZoomShotDriveTime =
ZoomTotalDriveTime × ABS (ZoomShotDistance)
÷ ZoomTotalDistance
S3903
ZoomShotWaitTime =
ShotDriveTime − ZoomShotDriveTime
S3904
S3905
ZoomShotWaitTime
< 0
≧ 0
S3906
ZoomShotWaitTime = 0
S3907
ZoomTableNo
≧ 8
< 8
S3908
ZoomTableNo = ZoomTableNo + 1
S3909
WIDE
ZoomingDir
TELE
S3910
ZoomShotWaitTime = 0
END

FIG. 39